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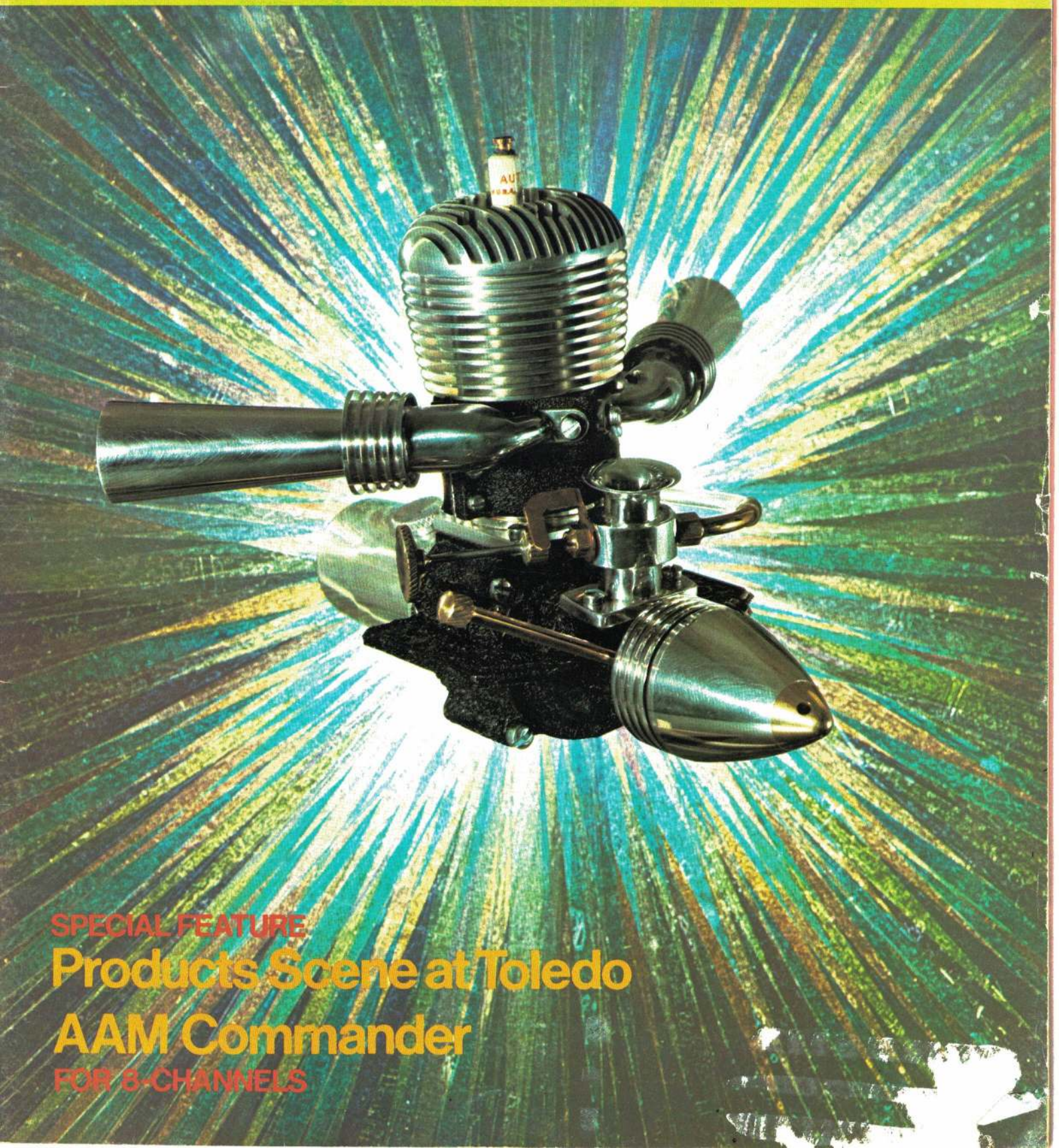
AMERICAN aircraft modeler



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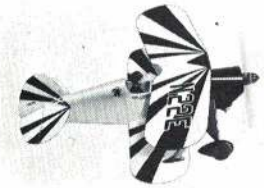

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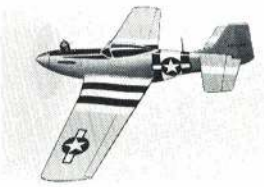

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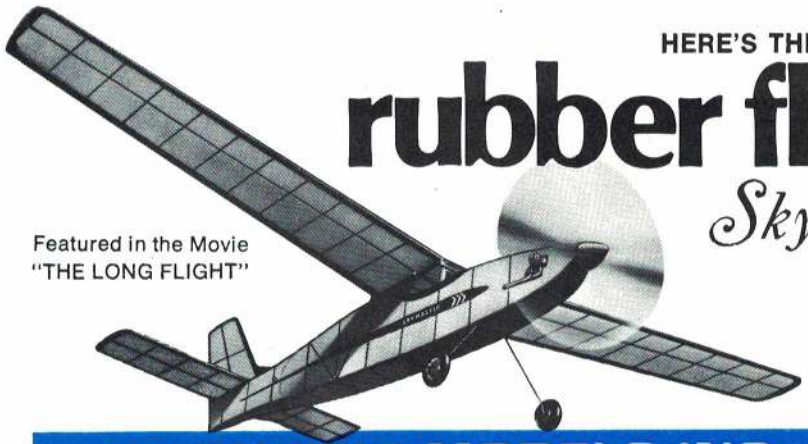

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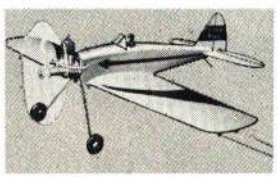

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AMERICAN aircraft modeler

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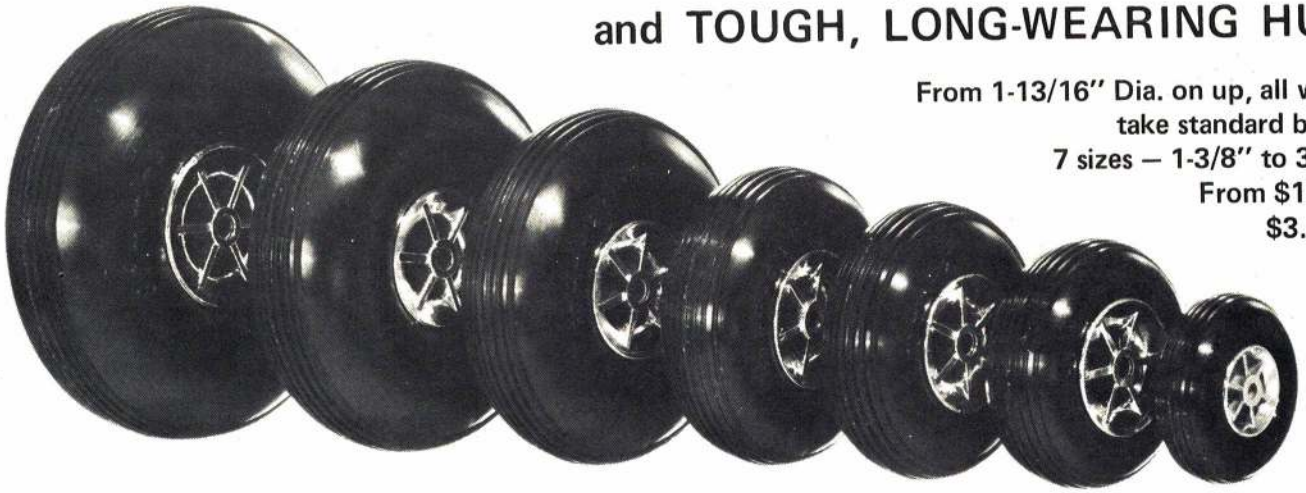

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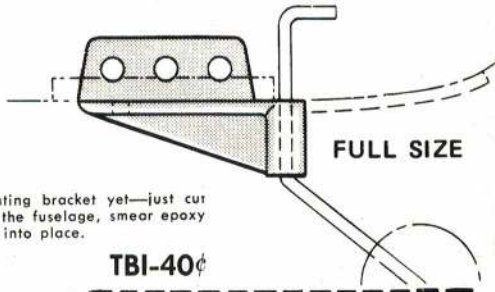

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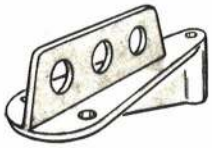

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Cover Story

JOHN NUOVO'S ENGINES

The engine featured on this month's cover, the *Black Dragon 65,* was built by John Nuovo of Antioch, California. John has been a machinist professionally for sixteen years, and a model builder for over twenty-eight years. His most impressive credential, however, is the fact that in 1944 he purchased a G.H.Q. and made it run. This puts John in some pretty rare and elite company. He got into engine machine work about seven years ago, by first repairing old ignition engines, and then building complete engines from casting kits.

John is presently making some very fine custom twins and is starting into four-cylinder flat opposed. He expects to someday "graduate" to building radials. John has the collector's spirit, and, to keep his engines rare as well as unique, he plans never to build more than ten of any one design.

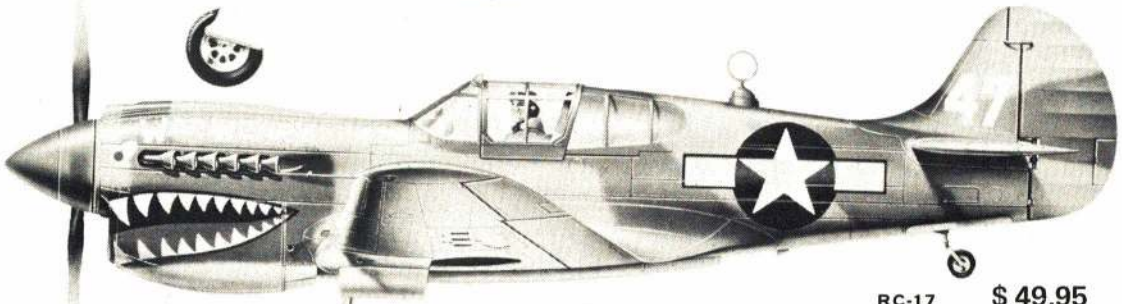
The *Black Dragon 65* has an enclosed ignition point system. The bore and stroke are "square," that is, they are both the same at 15/16". It uses a hardened steel liner and two-ring aluminum piston, and has dual bypasses, and, of course, dual exhaust stacks. Running on spark ignition with those dual megaphones, the *Black Dragon* shakes the very earth, and will loosen the fillings in one's teeth at fifty paces! However, with a price tag of $285, most of these engines will go into collections and never be run, much less flown, in an airplane.

The large engine pictured to the left of the *Black Dragon* is an *Apex*, of 1.20 cubic inch displacement. John machined this engine as a copy of the originals from original casting sets. It was never clear whether the *Apex 120* was copied from, or copied by, the *Forster 99,* but at any rate, there is a strong design resemblance. The *Forster* became much more popular, so that the *Apex* is today the rarer of the two in old engine collections.

The third engine in the photograph is the *Bungay Twin,* custom designed from old and new components. Pistons and cylinders from the old classic *Bungay* single-cylinder racing engines were used. The front housing is a modern Supertigre unit, and the crankcase is of original design. An Anderson Spitfire timer is used. A lot of difficult machining went into this one to make it directly opposed, with no cylinder offset.

Terry Aldrich is the cover photographer who developed the special lighting effect by attaching the *Black Dragon* to a sheet of clear plastic and backlighting it with polarized light shot through laminations of stressed clear plastic. A second polarized lens was used on Terry's camera.

RC-16 $45.00



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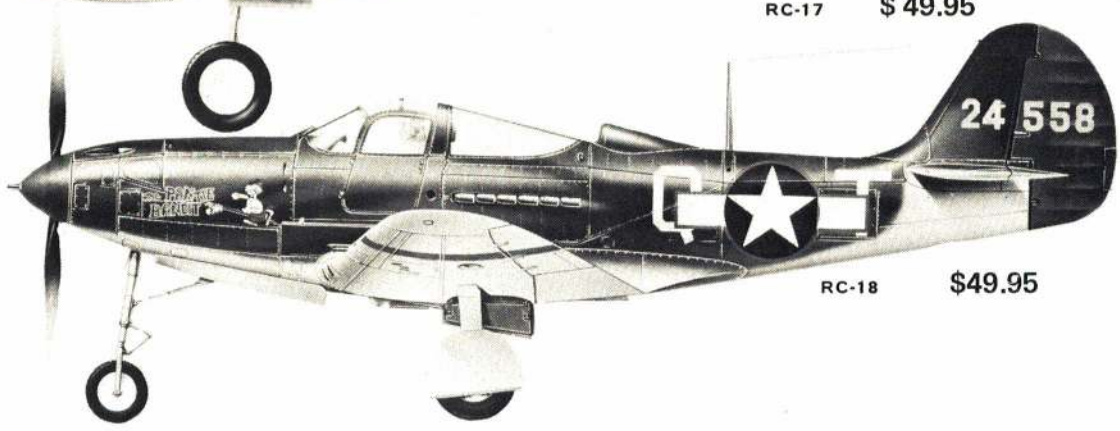

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Modeler Mail

Needs expert advice

I have a few questions that perhaps you experts can answer. First, is there a good way to light a DT fuse without using a cigarette? Second, what would be the best way to achieve the correct center of gravity on an Old Timer free flight without adding weight to the front end equivalent to batteries, coil, condenser, etc.? Would increasing the stabilizer area accomplish this and if so, by what percent? If stab area is increased, would model be acceptable in Old Timer (S. A. M.) contests?

John A. Epley, 1130 Coolidge, Wichita, Kan. 67203

Hurray for non-smoking! Yes, an electric element cigarette lighter works very well on properly prepared fuse. About that CG—its proper location will do more good even at a slightly higher total weight than a bigger stab. Try moving the motor further forward or use a heavy spinner on it.

—Editor.

Safety is paramount

Having just read the May issue of AAM, I would like to say that I am very pleased with the quality of material presented. However, as a designer and competitor in the Combat event, I feel that I must take issue with one of the articles in this month's magazine. The article on the Scorpion contained a comment that I think needs to be corrected.

The author gave the design criteria for a successful Combat model; the individual items he listed were true enough (maneuverability, high speed, light weight, high strength, ease of construction, low cost and safety), but I think that the order in which they were listed should be rearranged—SAFETY comes first.

Gary James
Dept. of Aerospace Engineering
University of Kansas
Lawrence, Kan.

Modeler search

I am trying to locate a fellow modeler who introduced me to this hobby in the Sixties. His name is Abram VanDover, and he was a sergeant in the U.S. Army at Fort Rucker, Alabama in 1961 and 1962. He was then sent to Germany for a tour. Since then I have lost contact with him.

He was a charter member of the "Wiregrass Hoppers" at Fort Rucker and flew in many AMA contests in the Alabama/Florida area. Any address would be very helpful.

Alan Mkitarian, 7750 Roosevelt Blvd., Philadelphia, Pa. 19152

RC Carrier, Why not?

I would like to know if anyone has ever tried RC Carrier. It seems to me that it would work. After all, if the Control Line people can do it, why can't we? If we could do it, why not make it into an event at an AMA meet? RC Carrier sounds good to me. What do you and your readers think about it?

Kevin Adasczek
Linden, N.J.

It has been done. A mini-carrier was made out in Seattle, Washington, and Doc Brooke landed a scale RC Corsaire model successfully on it for an air show! About six years ago.

—Editor.

Belated thanks

From the age of about eight until 18 in 1950, I was an avid model builder. Then girls, marriage, family and school took up my time. About twice a year I would buy a model magazine and look through it thinking maybe someday I'd try it again. Then in September 1969 I bought a copy of AAM and read what Bill Winter had to say about free flight in his editorial. It ended with "Why not try a free flight? Maybe you are missing something great. It ain't a pylon, but start with a Midwest Sniffer, say. . . ."

I went and got a Sniffer, an 020 Cox, glue, dope and I was back in business. Since then I have gone through the multi-channel route and have now settled down with an ACE pulse system, a couple of Hannan plans and a few small towline gliders.

Building models is again giving me many hours of pleasure and I want to thank you for that editorial back in 1969.

Ken Simpson, Cedarburg, Wisc.

Thank heaven for 3 in 1!

I have a Max O.S. 35 and it was running perfectly until recently. My engine had a severe compression problem. I found out that the reason it wouldn't start was that it wouldn't hold compression for more than one or two seconds.

I would like to take this opportunity to thank Al Rabe for his April column on CL Stunt. I dropped a couple of drops of 3 in 1 oil into the port and venturi and now it holds its compression perfectly and runs like a dream. I don't know how a couple of drops of oil could make such a difference, but it did.

Ken Johnson, Simi, Calif.

More feedback on "Maybe It Stalled"

I was just reading through the News Bits section of your February '73 issue. I must take exception with a misconception printed in the paragraph entitled "Maybe it Stalled." Don Henry is quoted as saying that an aircraft turning from a headwind to a crosswind loses airspeed and thus can stall if the reduction in airspeed puts it below its stall-speed. This is not true.

I refer to FAA Exam-O-Gram No. 17 titled "Common Misconceptions." It says in part ". . .airspeed is the only speed which holds any significance for an airplane. Once it is off the ground, an airplane feels nothing but its own speed through the air. It makes absolutely no difference what its speed happens to be in relation to the ground. The aircraft in flight feels no wind. It simply proceeds, operating with the same mechanical efficiency, upwind, downwind, cross-wind, or in no wind at all."

I would say that the modelers were losing their craft as a result of too much bank and/or too little airspeed almost exclusively. A 60 degree bank will increase the stallspeed 40%, as an example. I suggest that various model clubs should obtain a flight or ground instructor to lecture them on the aeronautics involved with airplanes. Many certified instructors would be glad to help out, myself included. It might save a fortune in smashed models.

Mark L. Welter, Basic Ground Instructor, Webster, Minn.

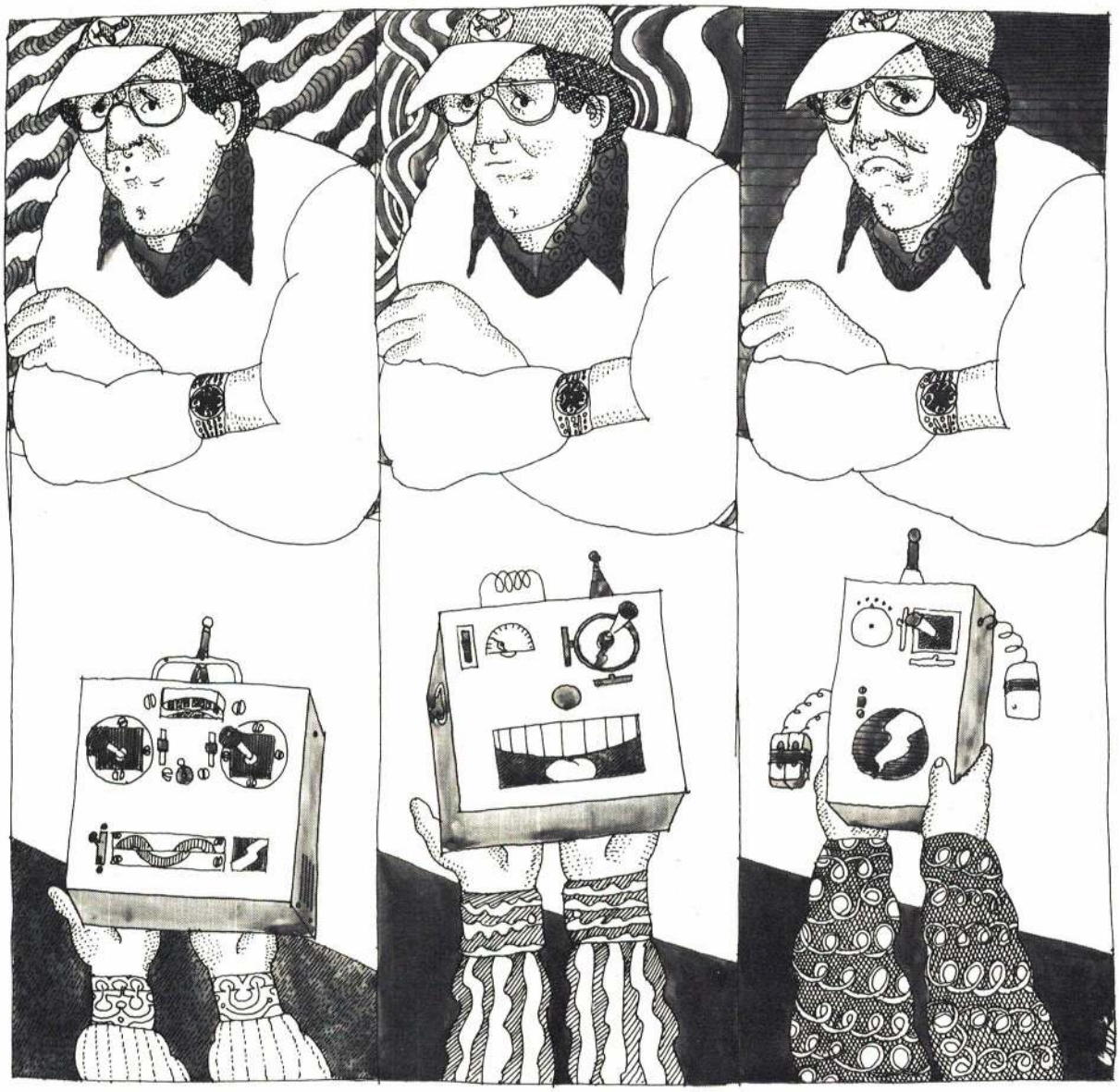
This letter is in response to a portion of the "News Bits," on page 100 of the February 1973 AAM. As I understand it, this article is paraphrasing an article by Don Henry in the Kansas City RC Club's newsletter "Contacts." I don't like to see an erroneous technical concept remain uncorrected, particularly in a national magazine which is a semi-authority merely because of the fact that it is widely read.

I am referring to the concept that an airplane (FF or RC, not UC which is still physically connected to the ground) acts differently when it is traveling cross-wind or downwind as compared to an into-the-wind heading. It is a fact that, except for gusts, once it leaves the ground the airplane can't tell the difference between any particular heading, and in fact, doesn't even know the wind is blowing. Airspeed is completely independent of wind; being dependent only on throttle setting, airplane attitude and control surface forces (again ignoring gusts). Incidentally, the main point of Mr. Henry's article is well taken—don't make any major control movements until you have enough airspeed. A steep turn is particularly bad, snap rolls are nasty things close to the ground.

C. L. Malinka, Rialto, Calif.

(Continued on page 61)

The experienced flyer is a pretty tough customer.



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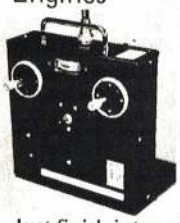

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Plywood and foam construciton

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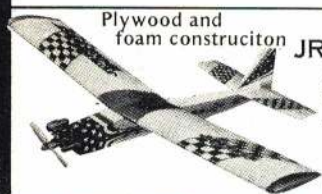


46" wing span
376 sq." area.
.09-.15 dispt.

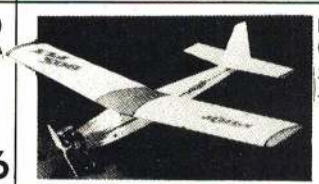
$13.99

SUPER KAOS

Retrail $57.95

58½" span
.60 dispt.

$45.76



PILOT BOX FLY & O.S. 25R/C !

52½" span /430sq. inches
.19-.25 disp. / 3 channels.

$53.45 VALUE !

$39.90

COX SANDBLASTER

Adjustable steering and powered by Cox .049 ! Recoil starter and heat sink. Free running.

$12.90

MIDWEST CESSNA CARDINAL

All foam one piece wing and one piece fuselage.

For .049 to .19 engines.

Retail $21.95 **$15.90**

COX .049 BABE BEE
Retail $ 5.98 **$3.90**

COX .049 GOLDEN BEE
Retail $7.50 **$4.90**

Midwest SUPER CHIPMUNK & TAIPAN .15 R/C!

$34.80

For rudder only, pulse - all foam 32"

ACE DICKS DREAM & COX PEE WEE .020 $13.93 VALUE

$9.90

58½" span for 4 channels, and — r.p.m.s by McCOY 40R/C!

RCM TRAINER & MCOY 40R/C

$52.90

6475 KNOTT AVENUE BUENA PARK, CALIFORNIA 90620 TELEPHONE 714 522 4921

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CIRRUS Hobby Shack | SIX

SIX CHANNELS, TWO STICK
27 OR 72 MHZ.

6 CHANNEL TRANSMITTER, 6 CHANNEL RECEIVER, FOUR RS-5 SERVOS, NICADS, CHARGER, SWITCH HARNESS AND SERVOS TRAYS.

*INTEGRATED CIRCUITS / *VERY LOW BATTERY DRAIN / *2 WIRE BATTERY PACK, 3 wire SERVOS / *FULL 90 DAY WARRANTY, serviced at World Engines or Hobby Shack / *BUDDY BOX / NICAD BATTERY BOX / *12 volt TRANSMITTER

Why buy a 4 or 5 channel R/C system, when our 6 CHANNEL system sells for

$209.00

taipan WON'T BE BEAT

In December of 72' we introduced the new Taipan .21 (3.5cc) Twin Ball Race Schneurle Engine. No big hurrahs, no great claims, just an ad telling you modelers a new engine was available. In these past few months we have yet to have one modeler who owns this engine, to say anything but praise for this engine. Not one modeler has stated to us that this was not the finest engine in its class that he has owned. The workmanship supurb, the rod a rugged one that will take the punishment of vigorous racing conditions, the case - heavy duty with extra good mounting supports, and the design well thought out. From the feed back of the marine modelers, new records will be set this year. For you flyers looking for a lot of extra power in the .15 to .19 size planes, consider the Taipan .21 Twin Ball Race (Blackhead).

*Blackhead
.21 (3.5cc)
Schneurle Ported
Twin Ball Race
$38.88

taipan
Precision engineering sets Taipan out - front in the top performance bracket !

Taipan .15 R/C
retail $24.95 . . . $19.96

Taipan .15 Twin Ball Race Diesel, retail $28.50
$22.67

Taipan .09 Diesel
retail $16.95 . . . $13.67

TAIPAN .21 BREAKS RECORD - 55 MPH!

Just before this ad went to press, we found out that Ron Erickson in the Seattle area easilly broke the class A hydro record with a speed of 55mph. using the Taipan .21 TBR schneurle. This was not a special engine, just one off the shelf and broken in!

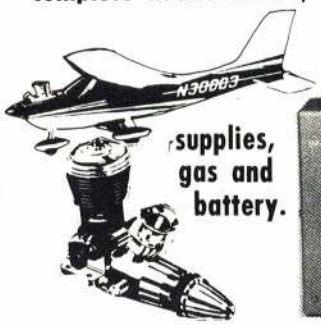
Note: For you Easterners a crank to make this engine legal for you, is now available!

If you want the biggest value ever offered for a beginner THEN you want our

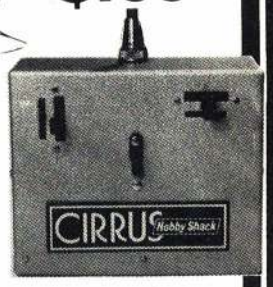
2ch. TOTAL PAK

Midwest CESSNA CARDINAL, CIRRUS 2CH. Medallion .09, complete hadhardware,

$103.00



supplies, gas and battery.



Everything the beginner needs for X-citing R/C flying fun, sumed up in one package of compatible systems! ★★★★★★★★★★★★★★★

TOTAL PAK includes the Midwest CARDINAL, an ideal beginners plane, all foam and a real stable flyer. The Cox Medallion .09 for just right amount of power, and the CIRRUS 2 channel for rudder and elevator control, plus 1 pair of Bubro 2" wheels, 1, 1¾" nose wheel, SS-3 tank, spinner, fuel line, collars, rubber bands, hobbypoxy, mounting bolts, prop, starting battery, fuel, glow plug clip and fuel filter.

True Pitch
PRECISION ENGINEERED

GLASS FILLED PROPS For extra power, and are now legal for ¼ Midget racing. True pitch at every station as their size designates. Glass filled nylon does not flex or warp, causing a loss of power or engine vibrations. Balanced to exactness of length and thickness. Try'em, you'll like em!

SIZE & PITCH	REG.$	SALE $	Dozen
Prop 7X6	75¢	59¢	$5.90
Prop 8X4	$1.00	79¢	$7.90
Prop 8X6	$1.00	79¢	$7.90
Prop 9X6	$1.25	99¢	$9.90

World Engines West Coast Factory Authorized Hobby Shack Service Center★★★★★★

For fast reliable service or warranty work on your World Engines or Cirrus radio control systems. Why not send your set to us HOBBY SHACK? Our factory trained tech is here as ad added service to you, our customer. ■■■■■■■■■■■□

PILOT SKYWAGON
52¾" span
485 sq"" aera
.30-.40 dispt.
3-4 channels.
Retail $59.95
$39.99

NEW FROM WORLD ENGINES
½ DIAMOND
Balsa wood and Foam construction, for .25's
Retail $16.98
$12.99

TRADE YOUR CIRRUS 2Ch. OR HOBBY LOBBY 2Ch. IN ON OUR CIRRUS 6Ch.

Trade $165.00 + Cirrus 2 on 27mhz.
Trade $160.00 + Cirrus 2 on 72mhz.
Trade $165.00 + Hobby Lobby 2 on 27mhz.
Trade $160.00 + Hobby Lobby 2 on 72mhz.

We have found that many who purchase our 2 channel equipment are beginners who advise us that they feel our 2 channel system a most economical way to get inot R/C. After learning to fly and finding they truly enjoy this sport now consider getting a six channel system, thus we make you this offer !!!

*NOTE: Prices quoted on 2 channel systems must be working, if not lower vlaues are allowed.

THE FASTEST AND EASIEST WAY TO SHOP AT HOBBY SHACK
★★★★★★★★★★★★★★★★★★★★

C.O.D. OR CHARGECARD
Phone In ORDERS
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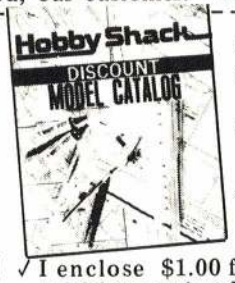
Rember we are open Monday through Friday from 9a.m. to 9p.m.; Saturdays from 9a.m. to 5p.m.; and Sundays from 10a.m. to 3p.m. For those of you back East that's 12:00 Midnight your time. If you want some one to take an order call us, . . . we specialize in it. ★★★★★★★★★★★★★★★★★★□



*Fully Illustrated
*Plan Construction Photos For Popular Kits
*Accessory Chart For almost every plane for needed hardware, tanks, tires, etc.
*Easy To Read—Easy To Order From!

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We're easy to find and close to any freeway. We're located between the Santa Ana Freeway (use the Artesia off ramp) and the Riverside Freeway -91- (use Knott off ramp) on Knott Ave. and the corner of 8th street. Look for a big red brick building facing knott avenue. Come in, we would like to meet you.

WE'RE OPEN 7 DAYS A WEEK AND EVENINGS TOO !
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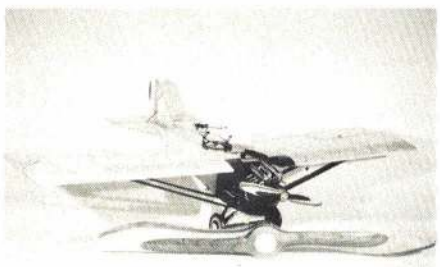
MODEL WORLD TOLEDO

ED SWEENEY

Above: A low altitude and very smooth demonstration of helicopter flight by the Graupner machine. With its collective pitch, the jump takeoffs were spectacular. Left: With a gentle launch Rudi Mayer gets his Upstart aloft. It handled the strong wind gusts easily on Sunday. Below: First place in Junior category is this excellent 1918 Loening M.8 monoplane by 14-year-old Norm Materyn.



Toledo is always more than just new products. Certainly to the hobby industry it is the annual new products announcement occasion. As modelers, we sure enjoy seeing what's new, but we also enjoy reacquainting ourselves with friends from last year, saying hello to Sid Gates, Carl Goldberg, Phil Kraft, Bob Elliot, Sid Axelrod, Ernie Weiss, Dan Pruss, Ken Wilson, Bill Hannah, John Maloney, Bob Novac, the South's Jim Martin, Dewey Broberg, Don Mathis, and others just as memorable but too numerous to name. Did you know all of the manufacturers (you have seen them at Toledo) but did you know the name of the representative at that booth? In a hobby/sport such as ours, most modelers know the personalities involved.

Another facet of Toledo is seeing what our manufacturers are "big" on. What activity appears to them as being most fascinating to us, the purchasers and readers. Not too many years ago RC equipment miniaturization and micro miniaturization was news. Remember the first display of the Bonner 4RS? It was the talk of Toledo. The next year every manufacturer had tiny equipment. RC cars arrived, enthusiasm for car racing was high, ROAR was big and many manufacturers appeared at Toledo with new racing machinery. Cars began very scale-like—full suspensions and bodies—and were then simplified into hard-running durable machines. They are still going strong.

Soon we heard of Integrated Circuits. Discrete transistors, resistors, capacitors, diodes, and layouts were doomed to this new technology. Space age had come to RC. Early ICs were not ideal, but now they are great. Every radio uses them and we modelers take them for granted. Equipment reliability is vastly improved by them.

Left: AAM's Doug and Dave Boynton visit Bud Nosen's booth. Below: E.K. Products is a bust telling about all the new features and setting up their booth at the same time.

is trends too!

When ICs were new, when RC cars were new, no one believed that someone would develop and kit a helicopter for RC. Gads! There were bunches of them at Toledo this year. In fact, this was the second year of helicopters and these new machines have fabulous performance. There's lots more developing in swing-wingers in the future.

These days half the RC modeling population has and uses retracts. Two years ago they were almost unheard of. Remember Pappy deBolt's retracts *eight* years ago? Now we have eight manufacturers producing retracts. They are reliable and relatively simple to install. All the expert fliers believe they can't even fly straight and level with wheels in sight!

Toledo is also a showcase for many modelers who bring along their most fantastic winter projects to display on the viewing tables and to compete for various prize categories. AAM photographed most of the winners and will show them as lead photos of our Action Sections in this and many future issues.

What's coming in the next several Toledos? When will we see the first real production turbo-jet, prop-jet, commercial ducted fan, etc.? Electric flight is news right now. Is common availability and performance comparable to piston power just a year or two away? And auto-pilots!?

Put it all together and here's what you have—a K&B Schnuerle-ported 049 turbo-jet powered, collective pitch controlled machine guided by a 1 x 2 x 1" eight-channel IC RC Auto-Pilot, with retractable sponge racing tires, capable of preprogrammed flight through the full AMA/FAI pattern. It weighs one pound, starts electrically, and of course, it is stand-off scale helicopter—see you at Toledo next year.

The big Schuco-Hegi helicopter takes to the air for precision demonstration including many fast low passes.

Below: Fabulous finishes on all the boats. Here is first place winner, a "Crackerbox" by Ronald Witt. Left: Carolyn Munson, AAM Art Associate, with World Engines Blue Max TX, flies Ed Sweeney's "Boondocker" trainer. Her first flight!

A quiet moment at the Sonic-Tronics booth. Lots of accessories here.

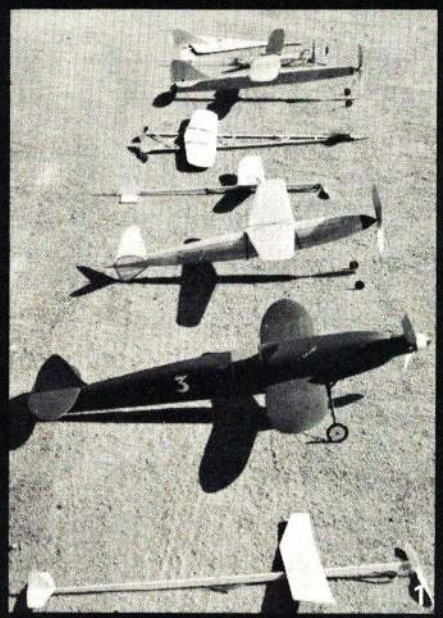
All kinds of products are featured by MRC including their own new brand of radio gear, airplanes, dune buggies, etc.

Dennis Donahue fires up the prototype Ross/ Wisniewski engine for a flight demonstration.

ON THE SCENE

RUBBER SCALE AT SAN MARCOS

BILL WARNER



(1) Non-scale event lineup. Long fuselages pack plenty of rubber and give good directional stability. (2) Scale models included quite a variety. In foreground are several Crosby CR 4 racers. Do you recognize the Howard Hughes racer? (3) Walt Mooney won prize for slowest racer. Aircraft is pre-WW I R.E.P. (4) Jack McCracken did 24.6 mph with his wheels-up Hughes Racer. (5) Warner's modified Lindbergh plan Caudron C-450 scored best scale time of 1.49 sec. for 88 ft.

How many modelers have built Rubber Scale racers which were flown for endurance only? Don't all raise your hands at the same time.

Reading about the Golden Age of Modeling, back when the quest for speed took rubber-powered ozone-eaters up around the 100 mph mark in frightening bursts of prop-shattering speed, a few of the North American Rockwell Flightmasters decided that it would be fun to rerun one of the old-time Speed events, only this time with *Scale* racers.

Naturally few of us really knew how to go about preparing ships for this type of endeavor, so a non-scale class was included for those not wanting to try race planes, but who wanted to participate. As it turned out, the meet drew 29 models, most of which were flown in the Scale event.

The 88-ft. course was set up by Granger and Larry Williams on the football field of the local high school. Timing was accomplished using the FAST Club's U-Control speed timer. When the plane passed the starting pylon, a one-hundredth's/second stopwatch mounted on a box was punched manually. As the ship zipped past the finish pylon (height unimportant), a button at the finish line was pressed. A line connected this button to an electric solenoid which stopped the watch. The speed of the model was easily converted to mph by dividing the time in seconds into 60.

Times were not as fast as they might have been, mainly due to the lack of experience with speed models. In fact, many models took off and flew more like endurance ships with spiral climbs and floating glides!

Common problems seemed to be too much weight for little wings to carry and incorrect airfoil. The planes which had the toughest luck seemed to be the fantastic vacuum-formed plastic and styrofoam Crosby CR-4s built by Bill Hannan, Granger Williams and Bill Pardoe. These beautiful little planes experienced stability problems which research later proved to be due to their special airfoil which was designed to fly with the chord line several degrees negative.

The Scale event was won by John Laycock and his P-51 Mustang with a fuselage carved from a solid block and hollowed. This gorgeous ship featured all sheet flying surfaces, as did many of the entries.

The fastest time of the meet was posted by Jack McCracken with a very light built-up model of his own design which burned up the course at 43.8 mph. The fastest time for Scale ships went to Bill Warner's Caudron C.460 modified from a Lindbergh plan featuring sheeted nose, semi-symmetrical airfoil, and a Williams Bros. nylon prop (40.3 mph). The slowest plane entered was Walt Mooney's R.E.P. racer, which sauntered over the course nonchalantly to cop the turtle awarded for performance below and behind the call of duty!

Following the morning flying, Flightmasters and guests adjourned to

(Continued on page 79)

CARL GOLDBERG

BOB VIOLETT
LARRY LEONARD
KENT NOGY
DON DEWEY
JOE BRIDI

DJ's MULTI-STRIPE

Kent Nogy and his World Record " Miss Dara" - 1 Min.23.4 Sec. Super Poxy finish, with DJ's Gold Multi-Stripe edging major color trim.

Packard Photography

Ever hear of those names? Well, those famous modelers are all using the other name - DJ's Multi Stripe - because it works, like no other striping tape ever! It's very thin and has a special expensive adhesive - so it bonds permanently, and sticks like paint. There's no other tape like it! Final fuelproof bonding takes place in sunlight. No more shrinking, lifting, and getting dirty - problems that end up ruining the looks of a beautiful model. More and more leaders are using DJ's, so take their tip - try it, you'll like it, too. Exclusively marketed by Carl Goldberg Models.

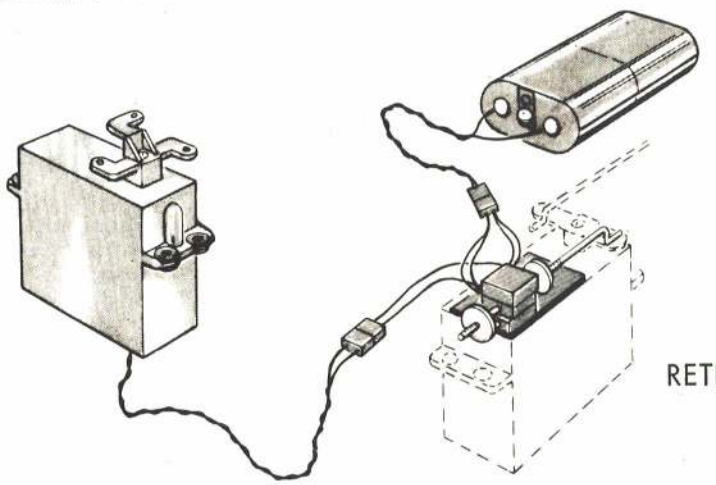
5 COLORS - RED, WHITE, BLACK, GOLD, DARK BLUE

4 SIZES

1/16" Wide, 36 Feet Long -	$1.98
3/32" Wide, 36 Feet Long -	2.69
1/8" Wide, 36 Feet Long -	2.69
1/4" Wide, 36 Feet Long -	3.69

NEW! RETRACT POWER SYSTEM FOR 4-CHANNEL FLYERS!

POWERFUL NEW SERVO, SPECIAL SWITCHING SYSTEM AND 2-CELL BATTERY PACK— WIRED UP READY TO INSTALL. LIGHT! COMPACT!



At last! A way for 4-Channel flyers to easily get into retracts. Our new power system is ready to go - just add 2 penlite cells, mount the trim-switch on your throttle servo, connect the retracts and that's it! When your throttle and trim levers are both moved all the way up or all the way down, your retracts will do the same! Servo has ample power, easily handles tri-gear operation.

RETRACT POWER SYSTEM
RPS-1 $29.95

P.S. For best service, see your dealer for items you want. If not available, write direct; add 50¢ per item ($1 outside U.S.). Minimum order $1.

ALL ITEMS AVAILABLE IN CANADA

Carl Goldberg Models Inc.
2545 W. Cermak Rd., Chicago, Ill. 60608
I am sending 25 cents for 8 pg. illustrated Catalog with Basic Explanation of R/C Equipment and Radio Control Definitions.

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CARL GOLDBERG MODELS INC.
2545 WEST CERMAK ROAD • CHICAGO, ILLINOIS 60608

NEW! Hobby Lobby's COMPLETELY **Ready-to-Fly** 3 CHANNEL AIRPLANE . . .

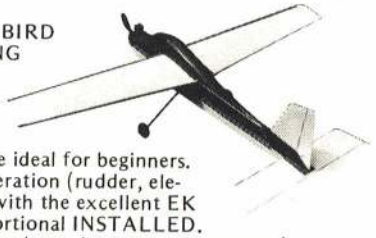
Ready Bird 23

$19900

The READY BIRD 23 is an almost fully assembled Lanier airplane with an EK Products "Little Red Brick" 3 Channel digital proportional system FULLY INSTALLED, a Fox 25RC engine INSTALLED, and pushrods, wheels, fuel tank, . . . EVERY-THING . . . FULLY INSTALLED AND ACTUALLY READY FOR YOU TO FLY!!!

Since we couldn't fit the fully assembled plane into a box you must glue the two wing halves together, and glue the tail to the fuselage. But, this only adds up to about 23 MINUTES WORK, and then you charge the airborne nickle cadmium batteries, gas 'er up, and GO FLY IT!!!

We actually have a problem describing the READY BIRD 23 because THERE HAS NEVER BEEN ANYTHING LIKE IT!! The airplane itself is a new 50" span plastic Lanier plane with a symmetrical airfoil wing that gives steady 3 channel handling characteristics even in wind, but retains enough stability to make the plane ideal for beginners. The READY BIRD 23 is designed for 3 channel operation (rudder, elevator, throttle) and your READY BIRD 23 comes with the excellent EK Products "Little Red Brick" 3 channel digital proportional INSTALLED. (You DO need to charge up the rechargeable airborne batteries—sorry about that!)



The *Ready Bird 23* comes with a Fox 25 RC engine INSTALLED

The correct Sullivan fuel tank is INSTALLED, the pushrods to rudder, elevator, throttle and steerable nose wheel are INSTALLED, and the clevises are even pre-fitted to fit the elevator and rudder horns.

What we're trying to say is that READY BIRD 23 is READY TO FLY—it's NOT an ALMOST-ready-to-fly!

If you were to take the READY BIRD 23 out to the flying field here are the items you'd need that are NOT included in the kit as you receive it from us: Epoxy glue, Can of glow fuel, starting battery and glow plug clip, 9 volt dry cell for transmitter. EVERYTHING ELSE IS IN THE BOX!

HOBBY LOBBY SuperTorque Electric Starter

$1995

Hobby Lobby's

Senior Telemaster

We've gotten quite a bit of flying time on our SENIOR TELEMASTER by now, and have come up with some ideas you might try on yours— **$57.95**

1. From the comments we've gotten apparently everybody is using Super Monokote or Solarfilm to cover this plane. Use of these covering materials results in a very much underweight Senior Telemaster—we used Super Monokote on ours and it weighs a little over 7 pounds. So, an interesting phenomenon occurs during flight—the STALLING SPEED of this super-light plane is LESS than the MINIMUM CONTROL SPEED (that is; the speed at which the ailerons and rudder are still effective). If you will raise both ailerons by about ¼" you will give the wing "washout" which will, in effect, bring your MINIMUM CONTROL SPEED down to as slow a speed as the STALLING SPEED.
2. Once you have reduced the MINIMUM CONTROL SPEED to equal the STALLING SPEED your SENIOR TELEMASTER can perform such wierd stunts as:
   a. Landing at about 7 miles per hour.
   b. Performing a descent by DETHERMALIZING (hold UP ELEVATOR to keep Senior Telemaster in a stall—maintain direction with ailerons and rudder.)
   c. ZERO GROUND SPEED landings in wind.
   d. 2 foot takeoff roll.
3. You know I want to sell Senior Telemasters (naturally), but, I can HONESTLY tell you that if you AREN'T flying a Senior Telemaster you are missing out on one of the most enjoyable experiences that I've ever had in this RC hobby.

EXTRA SPECIAL!

Here's the best deal we've ever offered on a Blue Max Semi-Kit – List price $265.00

Blue Max 6 CHANNEL Digital Proportional SEMI KIT . . .

$16800

with 4 FULLY ASSEMBLED SERVOS

The Blue Max SEMI KIT is still the least expensive way for you to acquire a multi-channel digital proportional system. Assembly is easy in that the tedious assembly of the small electronic components to the printed circuit boards has been done at the factory. You mainly have to do mechanical assembly and soldering of wires and connectors to the printed circuit boards.

Outfit includes semi-kits for transmitter, receiver-decoder, charger, and 4 assembled servos. Complete n-cads, factory warranty on all factory assembled P/C boards. Your choice of 27 or 72-75 mhz. frequencies.

TRY US OUT! P.K. Did –

"I am amazed, I ordered a Tri Squire and Fox 15 from you March 4, and received my order (on March 9). That's got to be a record!! Thank you for your splendid service."

P. K.—Oklahoma

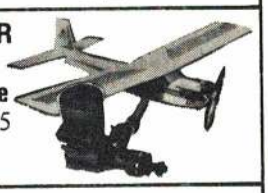
SAVE $$ ON THESE MATCHED COMBINATIONS

Midwest TRI-SQUIRE
and
Fox 15 R/C Engine
Total list value $33.90
SALE **$23.00**

Du Bro "Whirlybird" HELICOPTER
and
K & B 40 RC Engine
Total list value $162.00
SALE **$109.00**

Sig PIPER CUB J-3
71" Span,
4 Channels and
McCoy 35 R/C Engine
Total list value $48.90
SALE **$38.00**

Bridi RCM TRAINER
and
K & B 40 R/C Engine
Total list value $81.95
SALE **$59.00**



RCM BASIC TRAINER
50" span, 2,3, or 4 channels
and
McCoy 19 RC Engine
Total list value $50.90
SALE **$38.00**

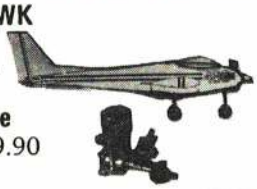
Midwest SWEET STIK
and
Fox 40 RC Engine
Total list value
$59.90 *SALE* **$39.00**

Lanier PINTO A-R-F and
Fox 25 RC Engine
Total list value
$65.90 *SALE* **$45.00**

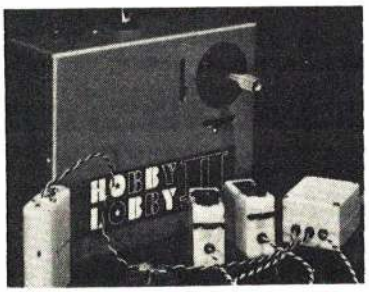
Dee Bee CARDINAL A-R-F
and
McCoy 19 RC Engine
Total list value $62.90
SALE **$42.00**

Carl Goldberg FALCON 56
and
OS 20 RC Engine
Total list value $44.93
SALE **$31.00**

World Engines HAWK 460 Foam A-R-F
52" Span, 4 channels
and
Fox 36 R/C Engine
Total list value $49.90
SALE **$35.00**



HOBBY LOBBY 2 Digital Proportional $79.95



A complete, ready-to-fly 2 channel digital proportional system with excellent range for demanding uses such as RC gliders, and with the built-in ruggedness that beginners need.

The SINGLE double-axis stick for rudder and elevator will make your transition to 4 and 5 channel control much easier than if you should get used to using your left hand for elevator on a cheaper 2-stick two channel outfit.

Outfit includes; transmitter, receiver, 2 world engines S-5 servos (interchangeable with Blue Max Mark II systems), battery box and switch harness, 27 mhz. Outfit uses dry cells (not included). **Add $6.50 for 72-75 mhz. band.**

NEW! Lanier SPRINT 25 A-R-F

List Price $ 42.95 *HOBBY LOBBY Price* **$ 34.97**

This is a smaller version of the Lanier Comet. SPRINT 25 (the "25" indicates the recommended engine size) has a 50" span symettrical wing and flies nicely on a .25, but will go like crazy on a K&B 40. Plane can be flown with or without ailerons, and should make an ideal beginners 3 channel trainer.

A novel feature of SPRINT 25 is that the elevator and rudder are already hinged in place.

Another innovation in the SPRINT 25 is that the canopy is large enough to house an aileron servo which can be mounted on the top side of the wing.

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"Our (Hobby Lobby 5) has performed flawlessly under all conditions and its performance has equalled or exceeded systems selling for twice the price.

. . . If you want an extremely precise system that will offer you years of reliable service, then we seriously recommend the Hobby Lobby 5 to your consideration."

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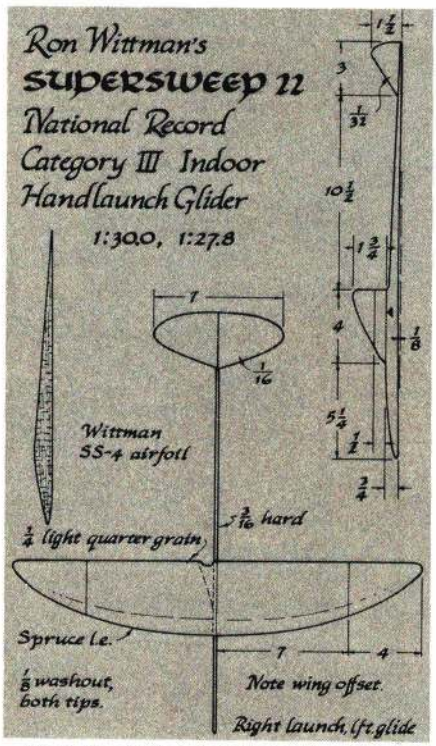
DURATION

BOB MEUSER ON FF SPORT

1:30-1HLG-Barrier Broken: Ron Wittman has accomplished what even the experts considered impossible: a 1 min. 30 sec. Indoor Handlaunch Glider flight. No newcomer to HLG flying, Ron has had three Nats first places in HLG, and this marks his fourth national record in HLG events, but his first record for Category III (unlimited ceiling height) Indoor. Ron decided to give the Cat. III record a good hard try some eight months ago, and has been sneaking up on that magic 1:30 through a succession of gliders of various sizes, but all having the basic format he has been working with for a decade. Flight duration has increased as wingspan increased.

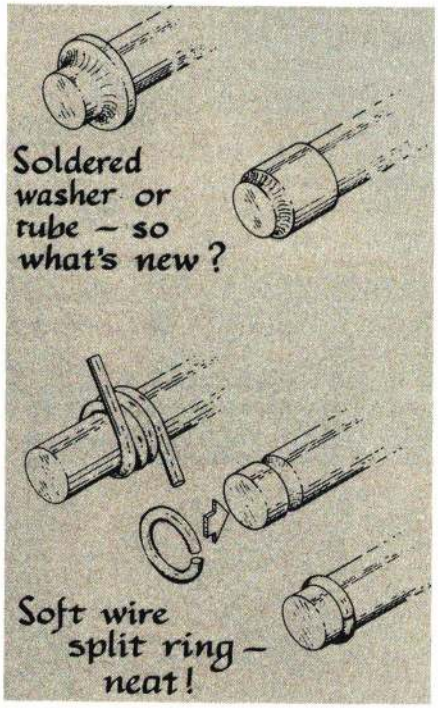
Ron Whittman and his miracle of 1:30 HLG. See text and drawing.

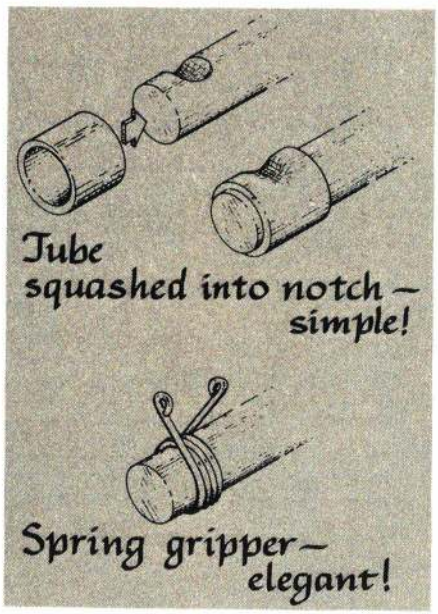


With his first Supersweep 22, after two test flights, Ron had six flights that were all between 1:22 and 1:24.7, and that in the face of a notation in his logbook: "Transition, fair —always stalls." But with the record within shooting distance, Ron seemed plagued by bad luck, for every really good flight ran afoul of a parked helicopter in the Santa Ana blimp hangar where he flew. Persistence pays though, for he managed to get a 1:30.0 and a 1:28.7 out of a string of six to establish a new record, in spite of not being able to get a good launch-to-glide transition.

Is 1:30 the ultimate? Not according to Ron, for he didn't even get a chance to try his Supersweep 24, and with the poor transition he wasn't even getting the ultimate out of the 22. The three-view shows the basic configuration and airfoil, but that is perhaps the least important 5% of what it takes to get 1:30. Other items, like a super finish, warps, adjustment technique, persistence, and a bit of luck now and again, are the major part of the story—a story we hope Ron will tell one day.

Shaft Collars: The problem—securing wheels to their axles, rubber-powered prop blades to their bent-music-wire hubs, and the like. The time-honored solution is the soldered-on washer or short piece of brass tubing. To prevent soldering acid or paste from gooking things up, tin both axle and washer with solder first, remove all of the flux, then solder the washer in place without the addition of more flux. Changes at the flying field are a bit difficult, however, unless you have a 30-mile extension cord for your soldering iron, or one of the new cordless electric ones powered by NiCads.





A noted Wakefield flier, who shall remain nameless (George Nameless, they call him), keeps his folding prop blades from coming off the ends of their axles by simply wrapping glue-soaked thread around the end of the wire axle. To have that work dependably would take more luck than I have! For 1/8-in. shafts, neat set-screw collars can be purchased at the hobby shops, but the problem comes with small shafts. The soft-wire retaining ring works well on shafts as small as 1/16 in. Annealed iron wire, or perhaps brass or copper, is wound around a shaft, then snipped into split rings using diagonal cutters. The shaft is grooved using a rotary grinder, such as a Dremel tool. Don't try to file it—hard music wire and files are not friendly toward each other. Slip the ring over the groove, squeeze into place with pliers.

The following method works even on 1/32 wire, and is quick and simple, but it is not as neat looking as the split ring. Grind a notch into the wire, slip a short piece of aluminum tubing over the notch, and squash the tubing into the groove using round-nose pliers. To remove, grab the tubing with pliers, give it a twist and a pull.

The most elegant scheme of all is the little spring clips used by Don Edson to hold his Wakefield prop blades on their 3/32 music wire axles. Springs are made by winding music wire around a mandrel. That is easily accomplished by clamping a hand drill in a vise, and using the unfluted part of a drill as a mandrel. A little experimentation will be required to make springs that have an inside diameter just slightly smaller than the axle. Short length (about six turns) are cut off, and the ends bent with round-nose pliers to form ears. The end of the axle should be tapered slightly. While pushing the retainer on or off the axle, rotate it in the direction that tends to make the spring unwind.

CARL MARONEY ON RC

Available RC Glider Films: During the past year, several requrets have been received regarding the availability of films on radio-controlled glider activities. The new AMA Film Library listing now has two color films available. One, entitled "1970 Nationals—Glenview, Ill." is a super 8MM, 11-min. duration covering radio-controlled glider (unofficial) events held at a separate site from the Nats. This film has no sound; however, it is professionally edited, titled and produced by our current AMA President, John E. Clemens of Dallas, Texas.

The second film entitled "RC Glider, General—1970" is 16MM ten-min. duration without sound. This film was produced by John Kiker, a Houston RC Club member and depicts what lunch-time RC flying is really like with modern equipment and techniques. The film was taken at the Manned Spacecraft Center in Houston, Texas with NASA engineers piloting. Coverage pertains mostly to powered gliders; however, some conventional powered flying is also included.

First priority on all new films is given to AMA Chartered Clubs, then regular AMA members. Each film requires a $7.00 deposit for AMA Clubs and a $10.00 deposit for all others. Five dollars of this is refunded upon return of the film, the balance covers postage and handling cost.

Since most new films are in great demand, they are often in circulation at the time requested, therefore, indicate a choice of preference. Only one of these films can be ordered and mailed at one time. Films must be handled with care, no admission charge may be made at showings, and any required repairs must be made properly before films are returned. Films must be returned or forwarded promptly after viewing. These films are forwarded to recipients in sequence, as ordered, to several clubs at a time via third class mail. Recipients must allow at least 60 days for delivery. Request for these films should be made directly to the Academy of Model Aeronautics, 806 Fifteenth St., N.W., Washington, D.C. 20005.

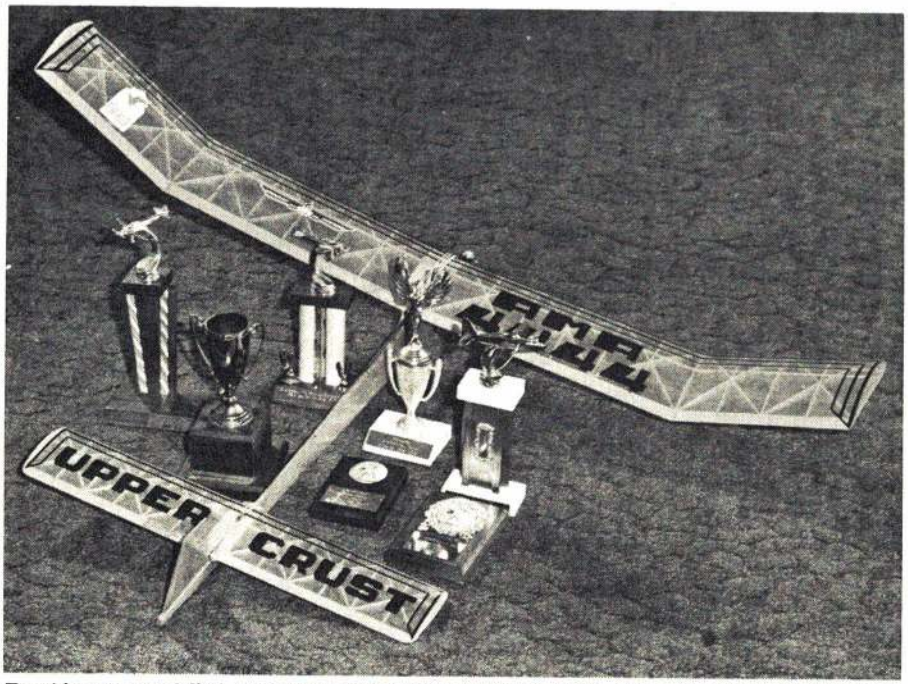
Toledo Narrative: There were many more RC gliders and manufacturers at the Toledo Show this year than ever before. Big Wendy, a glider entered by Tom Kelly, won first place in the Best RC Sailplane class. Two-year competitor Neil Liptak captured second position and Cliff Riedel's Nordic design won third place. The East Coast Soaring Society arranged a flight demonstration on Saturday—Dick Sarpolus piloted his latest design, Nebula, and Don Goughnour assisted as winch boss.

I want to thank the many readers who stopped by the ECSS booth to meet and chat with me. I appreciated your request to keep the columns coming. Now I ask you, keep the questions, sketches, articles and contest reports coming as this is *your* column.

Where the Action Is columns are what you readers are doing, making, or flying. Support your columnist with articles, photos, and ideas. Sketch your neat gadget. We'll draft it for presentation. Each item earns you a $5 bill. Submit to the writer, c/o AAM.

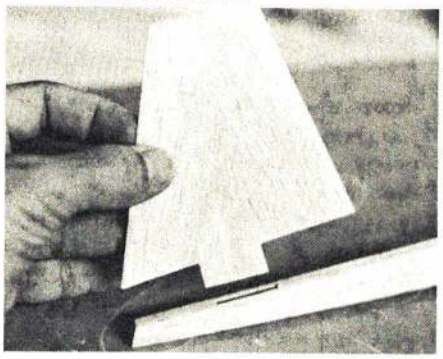
TYPICAL GROUP OF FREE FLIGHTERS
From left to right: Robert DeShields, "Hawkeye," D.G. Rheaume (kneeling), Gerald L. Clark and David R. Crowder.

UPPER CRUST

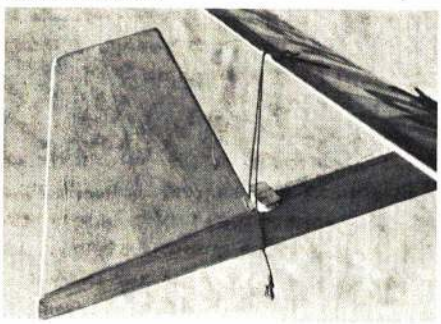


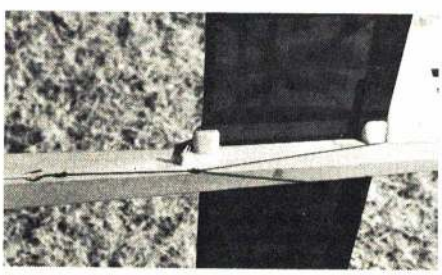
Trophies represent first, second and third places in Dallas, Tulsa, Oklahoma City and Wichita. A real swinging lady.

Rudder has a tab extending through fuselage top and glued to bottom.

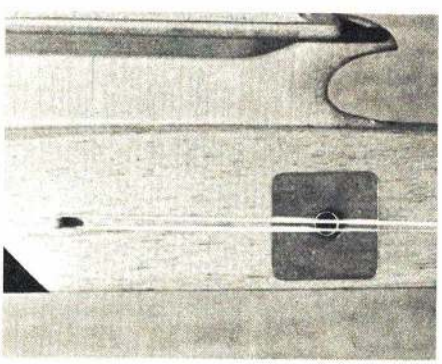


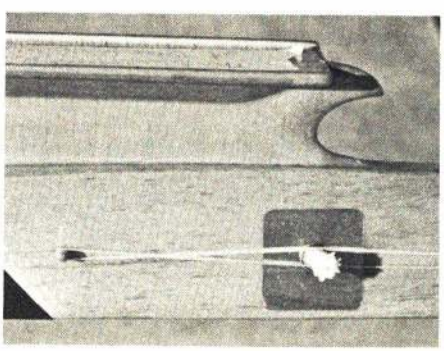
The stab DT limit string is a loop of radio-dial cord around tail.





Right: DT limit loop holds stab securely in position. Balsa fillets on stab seats. Below right: Cross rubber band strands to get pressure on fuse. Use 1/8 wide bands for good tension. Below: Correct alignment has DT rubber band falling across snuffer tube. Snuffer tube should be flush with fuselage side.





While relaxing in my hotel room in San Diego one evening following a hectic day of convention sessions, the urge to lay out a half-A free flight design that had been on my mind sent me through my attache case for drawing paper. Some computer printout paper was retrieved and the drafting was underway. That was in 1966, and the initial design evolved to what is now called the *Upper Crust*.

Originally the design was smallish in size and was influenced somewhat by British designs and Larry Conover's *Little Lindy*. But, as I fiddled with the design here and there and neared the time that the first stick was pinned to the plans, it took on more of the characteristics of the present design. In other words, I chickened out on the overall small size concept. About the only thing remaining on the current design resembling British half-As was the rear fin. However, in "honor" of my initial impressions, the first two or three ships built were called *Limey*. Then Dave Linstrum published a really British-type design with the same label. A name change was in order—hence the current name *Upper Crust*. There is no relation in the two names, but, in view of the modest contest success that the design had begun to achieve, Upper Crust seemed appropriate.

Speaking of contests, there have been very few meets entered in which the design has not placed. In such cases the reason has almost always been either fuel problems or my own foolish mistakes (like dethermalizing under power). The early models had wings utilizing the Warren Truss construction, and on a couple occasions folded when the ship DTed under power. On all models built in the past couple of years, the Union Jack or geodetic method of wing construction has been used. I still DT early on occasion, but have never folded one of these wings.

Although some of the construction procedures are not the most orthodox, I feel the added advantages are well worth the effort. The construction photos should help on the less familiar procedures.

Construction

The fuselage has basically triangular cross sections and provides the most rigid and indestructible pattern of construction I have ever used. It is certainly not new. The plans show ¼" hardwood motor bearers with "sideboard" type cowling. Of course, the cowling isn't necessary, but was used simply to dress up the appearance. Also, the firewall has been placed further back on some fuselages and the Tatone tank mount used. This is easily the simplest of the two front ends. If the Tatone tank is used, glue ½" triangular stock, 1½" long, into each of the corners of the fuselage just behind Former A. This will allow the nose to be trimmed down to a circle to match the back of the tank; in such case

Half-A free flight competitor based on British designs has a large wing area. Takes high nitro fuels for a screaming engine run. / by Gene L. Post

Former A should be balsa rather than plywood. A circular plywood firewall should then be epoxied to the front of Former A to support the tank mount.

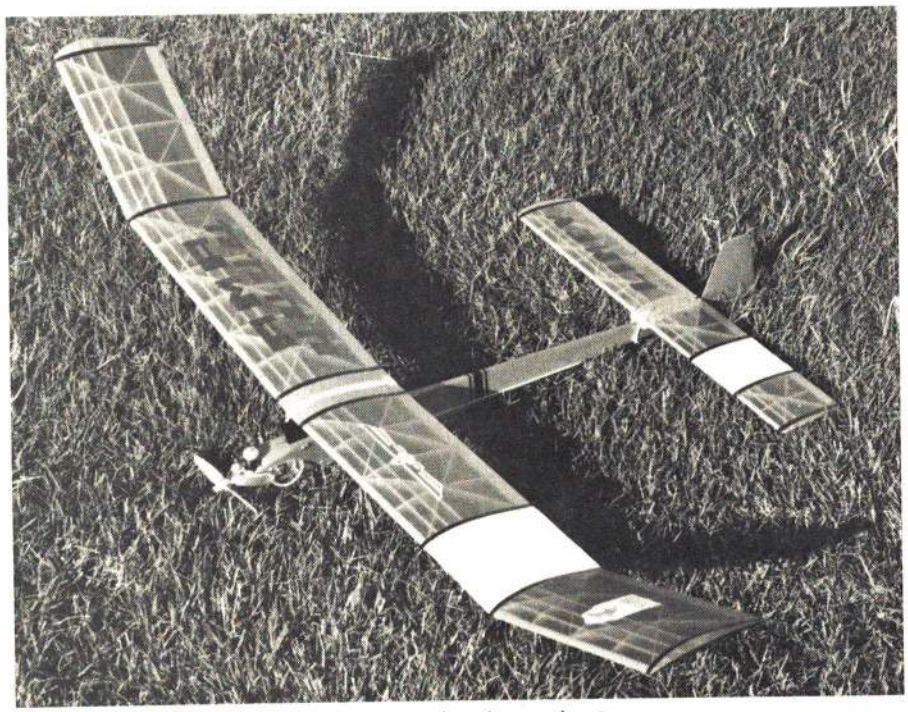
Construction is simple enough. Draw the outline of the fuselage onto a straight-grained piece of 1/16" sheet. If there is no "grain stress" in the sheet, which causes a strip to warp when cut from it, then cut the bottom sheeting out and glue the 1/8" sq. crutch and cross pieces in place, making sure the bottom sheet is straight. If there is doubt that the 1/16" sheet selected for the bottom is free of grain stress, then draw the outline and glue the crutch and cross pieces in place *before* cutting out the outline. The crutch will help keep the bottom true. Trim the sheet to shape after the crutch is secured to it. Mark carefully on the bottom sheet the position of each cross piece, or the former heights will not match the taper of the fuselage.

With this bottom assembly pinned down, cut out and glue the formers in position. After all the formers are secured in place, check the height of each from E rearward by using a metal straightedge. The straightedge should touch all formers when placed on top. If it doesn't, make the necessary corrections and glue the ¼ x 3/32" top strip in place from Former E to the tail. Be sure to cut the slot for the rudder extension before gluing to the formers. Trace the outline of the top sheet from Former E to A onto 3/32" sheet and cut out. Cut out the pylon slot. Place this top piece in position and make sure it matches the top widths of the formers. Apply glue and position it on the formers using pins to hold in place. Be sure to use the 1/8" sq. supports either side of Former E to give more gluing area for the top pieces. Glue the ¼" hardwood motor bearers in place and cut and glue five degree hardwood wedges to the motor bearers for downthrust.

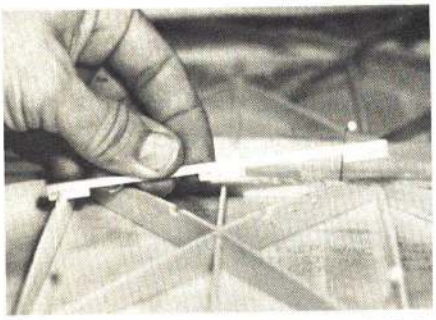
If you plan to use the Tatone tank mount, now is the time to glue in the ½" triangular pieces behind bulkhead A. Epoxy a No. 5 rectangular Perfect tank in the space between Formers A and B. If a pressure fuel system is used, then modify the tank as explained in the section on fuel systems. It may be necessary to use scrap balsa to position the tank properly. Epoxying it right to Former A should work fine. Position it so the vent and feed tubes will extend outside the side sheeting. You may find it necessary to unsolder the feed tube and reposition it to get the tank placed right. In putting the tank in place, leave enough room for the fuel cut-off timer in the same space.

Let the glue dry thoroughly at this point, then remove the assembly from the work board. If the bottom sheet has not yet been trimmed to shape, do so

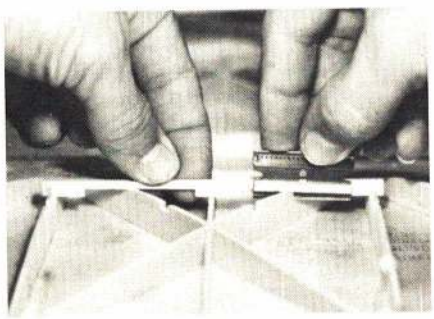
Plans on following page
Text continued on page 62



Author's lawn needs mowing. Cox gray prop's only way to go.

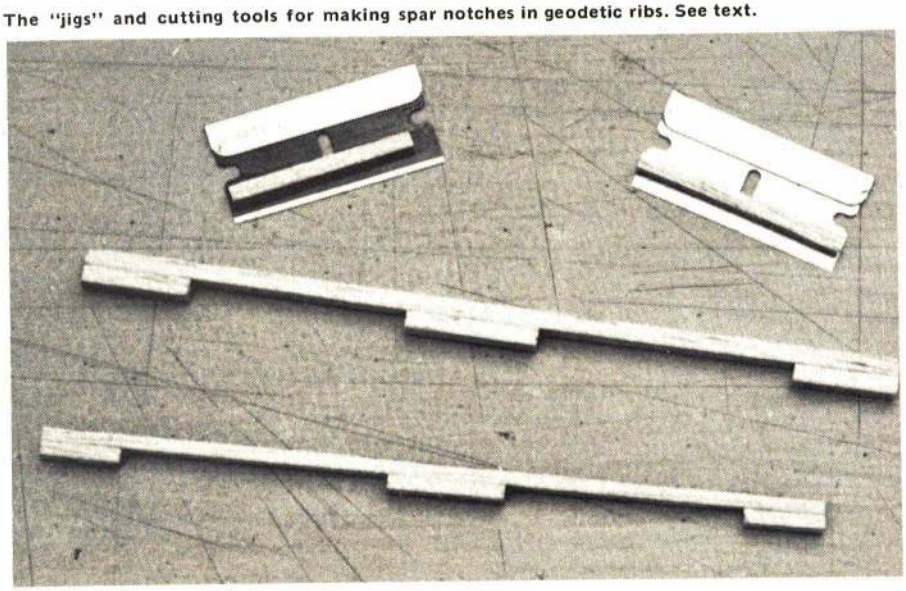


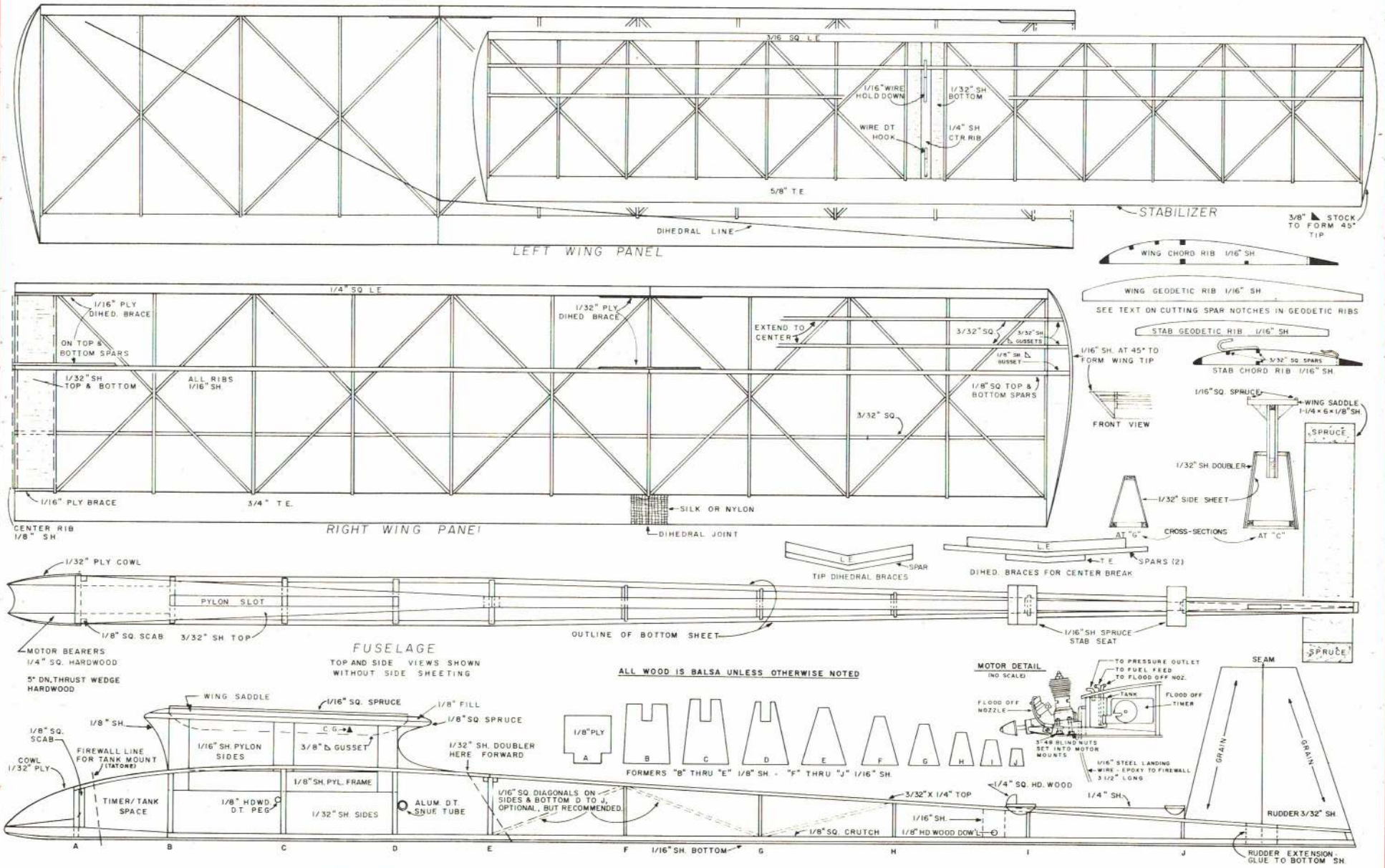
The jig spans three chord ribs to indicate notch positions in two geodetic ribs.



Cutting spar notches in geodetic ribs using the jig.

The "jigs" and cutting tools for making spar notches in geodetic ribs. See text.

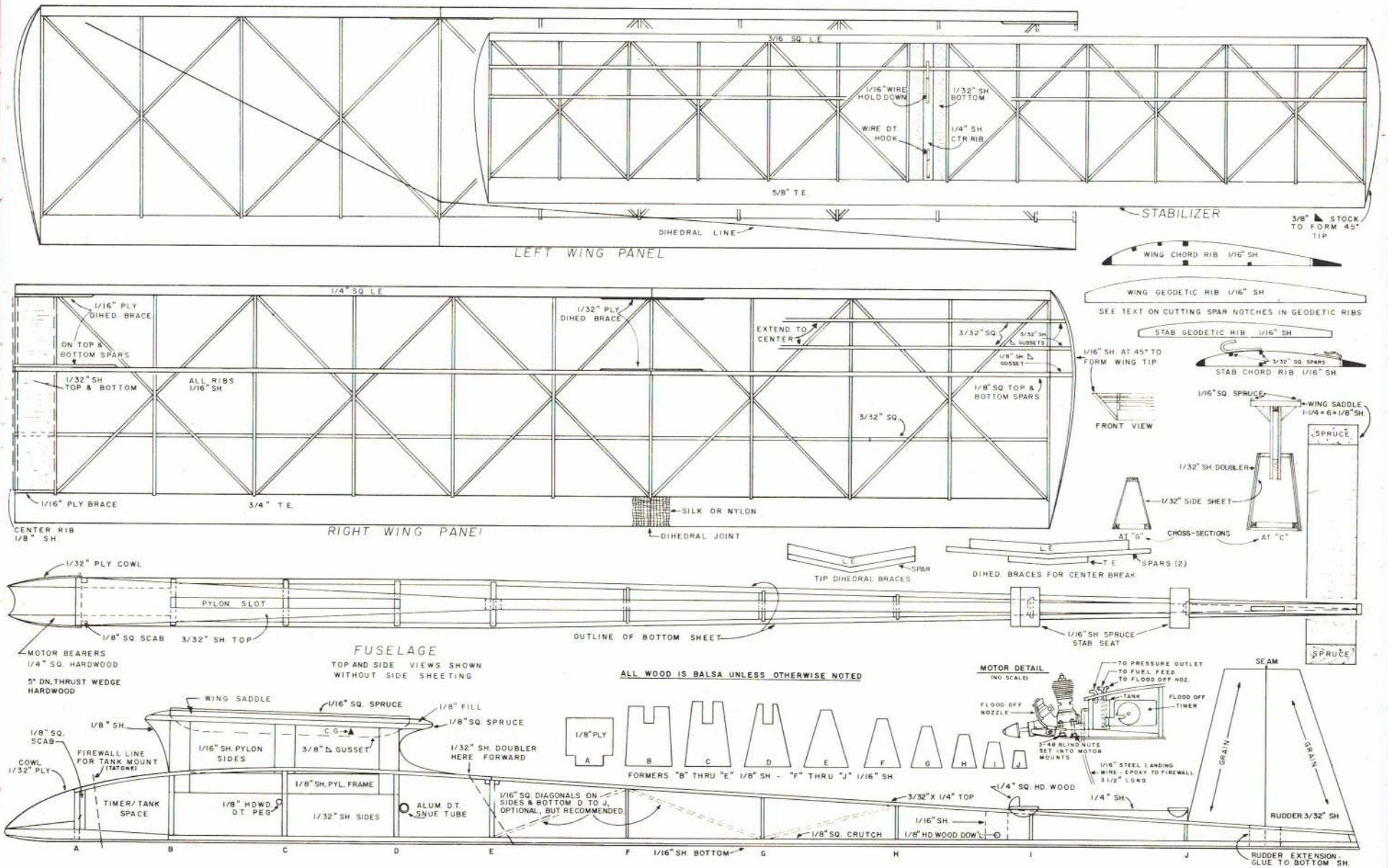




FULL-SIZE PLANS AVAILABLE—SEE PAGE 84

UPPER CRUST 1/2A

drawn & inked by gene l post



FULL-SIZE PLANS AVAILABLE—SEE PAGE 84

UPPER CRUST 1/2A

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new HEATHKIT 3-CHANNEL SYSTEM

goes to 4 channels when you're ready

New Heathkit GDA-1057 Systems, starting at $139.95.

There's no magic involved. Just traditional Heath planning and attention to detail. What appears to be a dandy kit-form 3-channel system, quickly and economically becomes 4 channels with the addition of an optional modification kit. Order 3 now, add the fourth later. It's a system designed to grow as your plans do.

The Heathkit GDA-1057 System uses the flight proven circuitry found in the popular Heathkit GD-19. The GDA-1057-1 3-Channel Transmitter comes with a 2-axis stick assembly. Add the GDA-1057-4 modification and you put 3 channels on the stick with the fourth controlled by a thumb tab. The GDA-1057-1 Transmitter is available on all R/C frequencies, and is housed in a slender new case for positive one-hand action during launch or engine adjustment. Other top-flight features include all nickel-cadmium battery packs with external charging unit, vinyl-covered front panel, adjustable hand strap, telescoping whip antenna, and relative power output meter that doubles as a battery-charging indicator. The new compact GDA-1057-2 3-Channel Receiver has a molded nylon case and connector block for servos and receiver battery pack. It's compatible with all Heathkit servos, and the GDA-1057-4 mod kit converts it to 4-channels too.

SPECIAL SYSTEM PRICE #1 — Order 3-Channel Transmitter, Receiver, Receiver Battery, two GDA-19-4 Standard Servos, pay just $139.95.

SPECIAL SYSTEM PRICE #2 — Order same system as above, substituting either GDA-405-44 Miniature Servos or GDA-505-44 Sub-miniature Servos, pay just $149.95.

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Kit GDA-405-44, miniature servo, 1 lb. **24.95***
Kit GDA-505-44, sub-miniature servo, 1 lb. .. **24.95***

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JOHN BURKAM ON HELICOPTERS

Everson's Scorpion Too: Harold Everson (Appleton, Wisc.) sent a picture of his beautiful and complicated Scorpion Too, made mostly from brass tube brazed together, and powered by a small electric motor. Cabin is made from fiberglass and epoxy over a wood plug. He says that the electric motor will lift it off the saw table but that the tail rotor had to be speeded up because it was only ten in. in diameter. Note that the model has the Scorpion type collective pitch control and a Hiller servo rotor as well, for stability and control. Very ingenious.

Let it be known that an electric-powered helicopter can be flown for hours in one's basement without stinking up the place, and with no starting problems, nor frozen fingers, ears, or toes.

Not all tethering systems are bad, either. Using a training landing gear, outriggers to each side and to the front almost to the edge of the rotor disk, tether the model by the two side outriggers as Gene Rock does. Run the chords out to the side as far as you can and put a tension spring in each line to ease the shock of coming up taut. Allow enough slack for the model to turn (yaw) about 90° right or left. This allows the model to rise three or four ft., go fore and aft six or eight ft. and sidewards about three ft. The power wires simply hang down to the floor and run over to the variac or the SCR speed control. This system is recommended more for the rank beginner who has never had a box in his hand before.

Back to the Scorpion Too, three questions: Isn't brass tube rather soft near the braze where it has been annealed? Also, after 20 or more crashes during the learning-to-fly process, aren't you going to wish you had a simple one-tube tail boom which can be discarded and another put in its place quickly? Maybe the Du-Bro Whirlybirds don't go very fast, due to their low rotor speed, but they don't do much damage in a crash; if they do, they are easy to fix up. Too bad all these Hueycobras and Jet Ranger models being sold don't have a simple skeleton structure to be used strictly for training.

Also, V-belts are great as long as they are dry. But once covered with exhaust fumes which seem to surround a hovering helicopter, their coefficient of friction goes to pot. Late word is that after talking to Dario Brisighella, Harold decided to save his Scorpion Too and build a simple trainer to learn to fly.

Nats Helicopter Event: For those wishing to practice the maneuvers for this event, they will likely be chosen from the following:
Slow Speed Precision Maneuvers (All at one rotor dia. alt. unless noted):

(1) Takeoff from ten ft. circle, hover motionless 15 sec. at one rotor dia. above takeoff spot.
(2) Fly ten ft. square with helicopter holding constant heading into the wind (if any) and constant one rotor dia. alt.
(3) Hovering 360° turn either direction, pausing at least one sec. at each of four major compass headings.
(4) Figure 8, starting at center and heading away from crowd, making each circle about 15 ft. dia. Only five pts. max. if pilot walks behind model.
(5) Pick up hoop from one ten ft. circle, deposit it in another ten ft. circle 30 ft. upwind. Ten pts. max. only if done within two min. of time helicopter enters first circle.
(6) Optional scale-like maneuver—lower hook, drop bomb, fire rocket, etc. Limit one maneuver.
(7) Land in center of 10 ft. circle.

Forward Flight Maneuvers:

(1) Takeoff from ten-ft. circle, climb at 45° angle upwind to 50 to 100 ft. altitude.
(2) Hover 15 sec. over spot reached at end of climb.
(3) Make large circle at constant altitude away from crowd.
(4) Upwind stall turn starting at minimum of 50 ft. altitude approx. 100 to 150 ft. upwind.
(5) High speed downwind pass at 30 ft. min. altitude.
(6) Downwind stall turn starting at 50 ft. min. altitude, approx. 50 to 100 ft. downwind and climb upwind or in a circle to a point 100 ft. directly over starting circle.
(7) Perform simulated (five pts.) or real (ten pts.) autorotation at approx. 45° angle of descent—helicopter in slightly nose down attitude—and resume level powered flight at 50 ft. altitude.
(8) Fly triangular course around two pylons and back to overhead above pilot at constant altitude 50 ft.
(9) Fly rectangular landing pattern away from crowd and spot land with no bounce in starting circle.

Free Style Maneuvers: Three from the following or invent own.

(1) Vertical ascent to maneuvering altitude.
(2) Demonstrate Vortex Ring State (partial power descent with zero relative wind speed) and recovery from by forward flight.
(3) Loop, roll, split S.
(4) Glider or parachute release at altitude.
(5) Vertical descent from 50 ft. alt.

Three categories of helicopters, competing in own class: (1) Torque reaction driven rotor; (2) Shaft driven rotor, non-scale; (3) Shaft driven rotor, scale.

In addition to the maneuvers, those completing certain specified maneuvers are eligible for judging for design, workmanship, or stand-off scale. The sequence of maneuvers will be chosen to follow one another without wasted flying time and without landing until the end of the maneuver group.

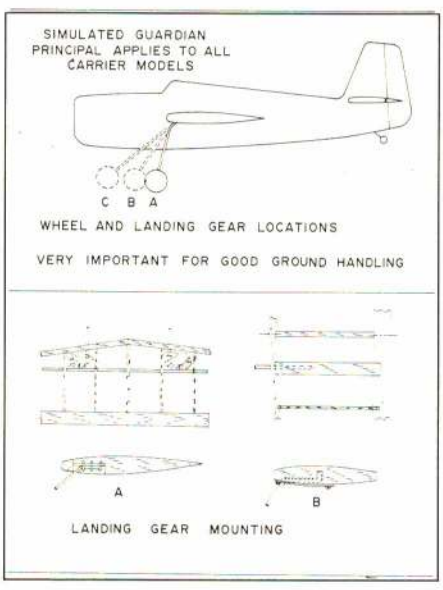
Whether you intend to compete or not, flying a prescribed set of maneuvers develops skill much more rapidly than just stooging around and it gives you a yardstick with which to measure progress.

JOHN BLUM ON CL CARRIER

Which Way the Gears: As with any other model airplane, the proper placement of the landing gears and wheels is very important in the Carrier model. They not only serve to carry the plane, but also to protect it.

The sketch shows three positions: "A," "B," and "C." Using a simulated Guardian only for illustration, "A" represents the scale location, "B" represents the near desirable position, and "C" depicts a "No-No."

The rules (AMA 1972 Rule Book, page 28, rule 20.10) state that the gear must protrude from the model at the same position as the prototype but need not be scale. This permits the modeler to place the wheel location at his discretion. Position "A," representing the scale position, is typcial of most scale aircraft in that the gear vertical alignment approaches right-angularity to the longitudinal centerline of the model subject. Taking off from a smooth surfaced carrier deck offers no problems. Considering the "jack-rabbit" start of most high-powered scale types, most anything would work. However, during the landing, two very undesirable aspects appear: (1) The near vertical alignment makes for poor ground handling characteristics should the landing take place anywhere but on the deck encouraging your model to roll or nose over; (2) With most arrested landings near the 20 mph mark, the model can experience an insufferable beating on the deck as the forward motion is transformed to downward motion when the tailhook catches the arresting cable, thus placing the impact almost totally on the gear mounting with the near vertical gear alignment. Both can attribute to short model life.



Position "B" offers, in approximation, the more desirable position by placing the subject's center of gravity farther to the rear of the wheel location. This produces better ground handling and adds an amount of shock absorbing action at time of arrested landing. The mount still experiences shock, but to a much lesser degree. Position "C" creates a seemingly better shock absorbing position, but surpasses the limits of good control allowing the model to bottom-out on the deck during an even-normal landing. This will allow the model rough treatment, an opportunity to nick or throw the prop and perhaps ruin an engine. In addition, some exaggerated forms of position "C" have been known to flip a model completely over.

Fastening the Gear: Amidst a multitude of methods, two are presented in the sketch. "A" depicts the typical installation of plywood platform with gear wire J-bolted or sewn to platform. This type offers simplicity with strength, but has handicaps.

Method "B" is designed to form a hardwood rib from 5/8" to 3/4" thick stock. The gear wire is bent to similar shape and set into a recess in the rib (the recess to be such to create a tight fit for the gear). A sheet metal plate is then placed over the gear and held by wood screws. Thus, an exchange of gears is permitted, but strength is maintained. Broken gears can be easily replaced or others can be changed to experiment with proper wheel location as discussed earlier.

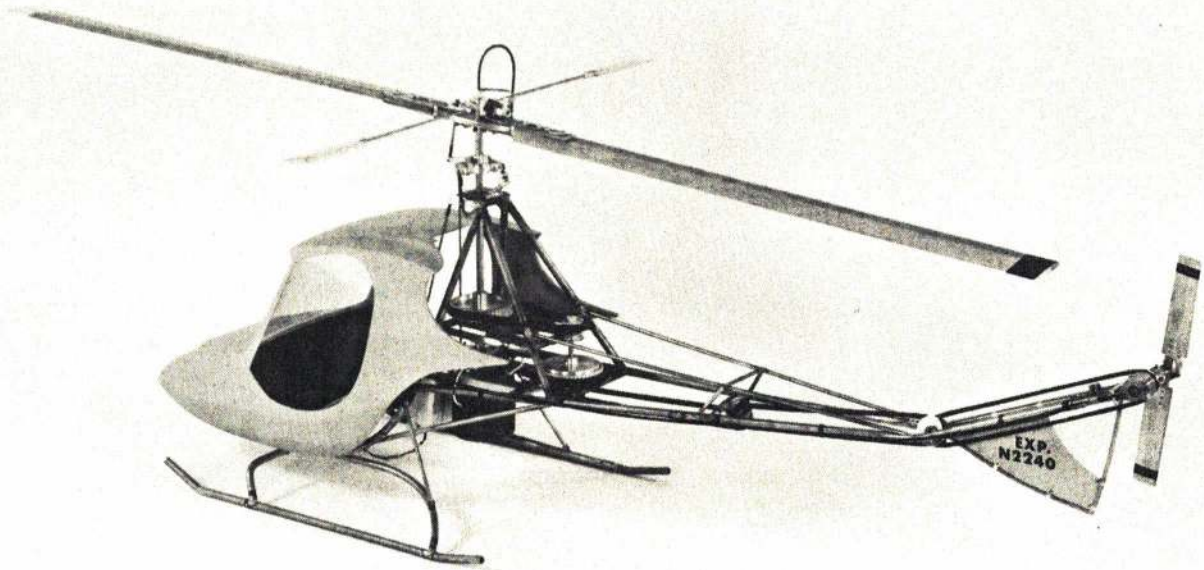
Pennsylvania Clubs: There are two new clubs in Pennsylvania. If you live near Butler and are interested contact Ralph Bruner (494 Sunset Dr., Butler, Pa. 16001). If you are near Sharon, Pennsylvania, contact Bob Holup (1610 Ridge Dr., Sharpsville, Pa. 16150).

BOB STALICK ON FF GLIDERS, POWER, RUBBER, INDOOR

Wind It Up: Last month we discussed the construction of propellers for rubber-powered models. So, if you followed the instructions, you're waiting to find out what to do next. First, find yourself some good rubber strip—preferably Pirelli. A good starting size is ¼ in. (6 mm). You probably can get it from the local hobby shop, if so, check it before you buy it by pulling a piece until it breaks. Poor rubber will break quickly. Good rubber takes a real effort to break. Beware of rubber stored in the sunlight or on a spool on a shelf.

After you have found the rubber, check it over for nicks and cuts, then cut off a length that will give you several loops that will just reach from your prop shaft to the rear hold-down peg in the fuselage. Tie the cut ends together snugly by using a square knot. Wash the motor in cool water using a non-detergent soap and then hang up to dry. When dry, lubricate the rubber well by using Sig rubber lube or castor oil.

Below left: Mr. and Mrs. George Rivers demonstrate classic winding technique at 1971 Nats Wakefield event. Below right: When no helper is available, use a stooge. Henry Wypyeh made one that angles the plane conveniently upward.



The not-quite-finished version of Harold Everson's Scorpion. Model was displayed at the WRAMS show finished and it is beautiful.

Install the motor in your model by using a 3/4-in. wide flat piece of wood several inches longer than the final motor length and notched at either end. Loop the motor onto this loading stick and fasten the rear hold-down peg through the rubber loop and your propeller onto the rubber sticking out the front of the model. Now, find a kind person who will anchor the rear of the model by holding onto a 1/8" or thicker wire that is placed through the rear peg. Then, after hooking the winder onto the prop assembly, walk backwards until you have stretched the rubber motor at least three times its regular length. Begin winding clockwise until you have about 100 to 150 turns into the rubber. As you reach the last 25 to 30 turns, begin to walk back toward the model so that your last several turns are made just as the noseblock is inserted into the front of the model.

You will want to use a good winder. A small hand drill will work fine for small amounts of rubber, but for Wakefield size and above, use a heavy-duty drill with the winding hook securely anchored into the shaft itself. Do not just tighten it into the chuck, as it *will* come out—with surprising speed. FAI Model Supply sells a specially made rubber winder that is excellent.

There are other modifications to the hand drill you may want to make, such as making a longer extension on the winding handle. Another thing to do is to find the gear ratio of your winder. Count the number of times the shaft rotates for a full 360 degree rotation of the winding handle. This is your winder's gear putting into the rubber motor.

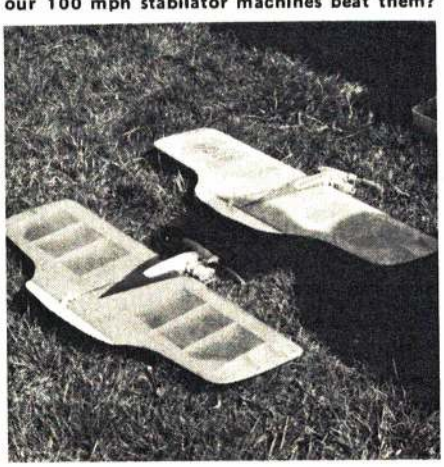
Experiment with your rubber motor. More strands will give you more zip in the climb, fewer will allow the motor to run longer. A typical Coupe d'Hiver setup using ten grams of rubber on a 16 in. dia. propeller should run around 20 to 30 sec. if fully wound. As a rule of thumb, you will want to wind near capacity of the rubber, which means around 380 turns on the above coupe motor of six strands of ¼ in. rubber, and for a Wakefield motor of 40 grams of ¼ in. rubber around 400 turns; however, rubber is extremely variable, so run your own tests to see just how far you can wind until it breaks.

Rubber models, in their near silent flight, are a fascinating area of modeling, in fact the oldest form of competitive modeling. I hope that I have helped you enjoy it a bit more. Write to me of your successes or your questions c/o **AAM**. Send your pictures, too.

HOWARD RUSH ON COMBAT

Miniature Aircraft Combat Association: This organization, an outgrowth of the Combat fliers' meeting at the 1972 Nationals, is intended to be a special interest group like NMPRA or NFFS. Its purposes are: (1) To gather ideas and offer inputs to the AMA, perhaps cutting lead time for rules updates; (2) To publish a handbook for Combat judges similar to the AMA RC Judges' Guide; (3) To recruit competent volunteers to conduct Combat at the Nationals; (4) To publish a newsletter with contest results and such; (5) To send a USA-Canada team to a World Combat Championship.

Ralph Warmon's Supernatural FAI design uses Oliver diesel typical of European models. Can our 100 mph stabilator machines beat them?



World Combat Championships: Why not? We have been waiting for years for Combat, the biggest non-Free Flight competition event, to become an official FAI World Championships event. FAI rules exist and international Combat meets have been held in Europe for several years, some in conjunction with the official, biennial FAI CL World Championships. Prospects are dim for inclusion of Combat into the FAI WCs. Our six-man AMA delegation to the annual FAI meeting in Paris tried hard, but was unable to mention Combat.

I propose that we hold a US-Canada Combat team selection either at the 1973 Nationals or at a central location in late summer to send a MACA-sponsored team to a World Combat Championships in Europe in 1974.

For more information on MACA or the World Combat Championships write H. Rush, 11020 Kent-Kangley Rd., B-51, Kent, Wash. 98031. Enclose a self-addressed, stamped envelope, please.

Winners of Last October FAI meet at Dayton, Ohio (l to r): Max Mearns, W. Va.; Gail Grunden, Ohio; and Kit Gerhart, Ind.

FIFTY-NINTH IN A SERIES

getting started in R/C

BACK TO BASICS

JIM McNERNEY

One of the occupational hazards of writing a Getting Started in RC series is the tendency to forget there are new people taking up the hobby every month. Each part of the series is the first part for thousands of people. Since this column is pitched to the new RCer, it can't serve its purpose without a certain amount of repetition. So, let's get back to basics.

Here are some of the questions most asked by a would-be RCer:

How much does it cost to get into RC? You can get a complete RC outfit (i.e., plane, engine and radio) for as little (?) as $100. The average pattern or sport model with a .60 cu. in. engine and four-channel radio costs $500 to $600. Airplane or glider kits are available in a range from $10 to $100. The median price is about $50. You can plan on spending from $10 to $50 for "extras" such as glue, covering material, finishing material, hardware, wheels, fuel tank, fuel line, etc.

Sport type engines are generally priced in proportion to the displacement, that is, the difference in cylinder volume with the piston at top dead center and bottom dead center. Displacement varies from 0.01 cu. in. to .80 cu. in. or higher for multi cylinder engines. Prices vary from about $5 for a non-throttling .049 to $600 for a six-cylinder, throttled engine. Sport RC engines in the .35 displacement range are about $30 to $35. Engines in the .60 displacement range are $40 to $100.

Radios vary in cost generally in proportion to the number of functions and "extras" provided. A simple, single-channel pulse proportional radio is available for about $60. In addition, you must purchase a dry nine-volt battery for the transmitter and a charger for the airborne nickel cadmium pack. A complete two-function digital proportional system can be purchased for $100 to $120. This also normally requires a separate dry battery for the transmitter. A five-function system, including four servos, all nickel cadmium batteries and charging equipment, can be purchased for about $300. Deluxe four- to seven-function systems can cost as much as $550.

The above prices are list and many of the items can be purchased at a discount. Although most of the engines are foreign built, the effects of recent currency revaluations are not considered. There is also the possibility of acquiring used equipment at a considerable savings, but this can be a chancy thing.

What frequencies are used for radio control? Radio control in the United States is authorized by the Federal Communications Commission in three bands—two in the Citizen's Radio Service and one in the Amateur radio service. Military drone control is assigned to other specific regions of the emission spectrum. The Citizen's Band frequencies are listed with the color code as follows:

Frequency MHz	Color Code
26.995	Brown
27.045	Red
27.095	Orange
27.145	Yellow
27.195	Green
72.080*	Brown/white
72.160	Blue/white
72.240*	Red/white
72.320	Violet/white
72.400*	Orange/white
72.960	Yellow/white
75.640*	Green/white

*For exclusive use to control model aircraft.

Pulse modulation transmissions are authorized for certain radio amateurs on the band between 51.0 and 54.0 MHz. By general agreement within the Academy of Model Aeronautics, the following standard frequencies and color codes have been adopted:

Frequency MHz	Color Code
53.1	Brown/black
53.2	Red/black
53.3	Orange/black
53.4	Yellow/black
53.5	Green/black

Operation of a transmitter above 100 mw output in the Citizen's Bands requires a Class C license. Operation in the amateur band requires a Technician, General or higher class amateur license. The color code refers to pennants which must be displayed from the transmitter antenna during operation. This assists other modelers in recognizing your transmitting frequency and reduces the probability of mutual interference (shooting each other down).

What does the term "channel" mean when applied to RC equipment? The term "channel" is a holdover from the days of reed relay systems. In these systems a set of audio tones were generated in the transmitter. In the receiver these tones vibrated appropriate reeds which closed relays to provide control operation. Each tone represented a "channel." The tone would operate a control fully in one direction only. Therefore, each function required two channels—for instance, the elevator function required up and down channels. A ten-channel reed system provided four control functions plus elevator trim. Nowadays in this country the terms "channel" and "function" have become interchangeable. When someone talks about a five-channel system they really mean a five-function system. The Germans have retained the old "channel" meaning. You may see some of their sets advertised as 12-channel systems, but they're really six-function systems. Confused?

Next month, more of the same.

INTRODUCING '73 1/2

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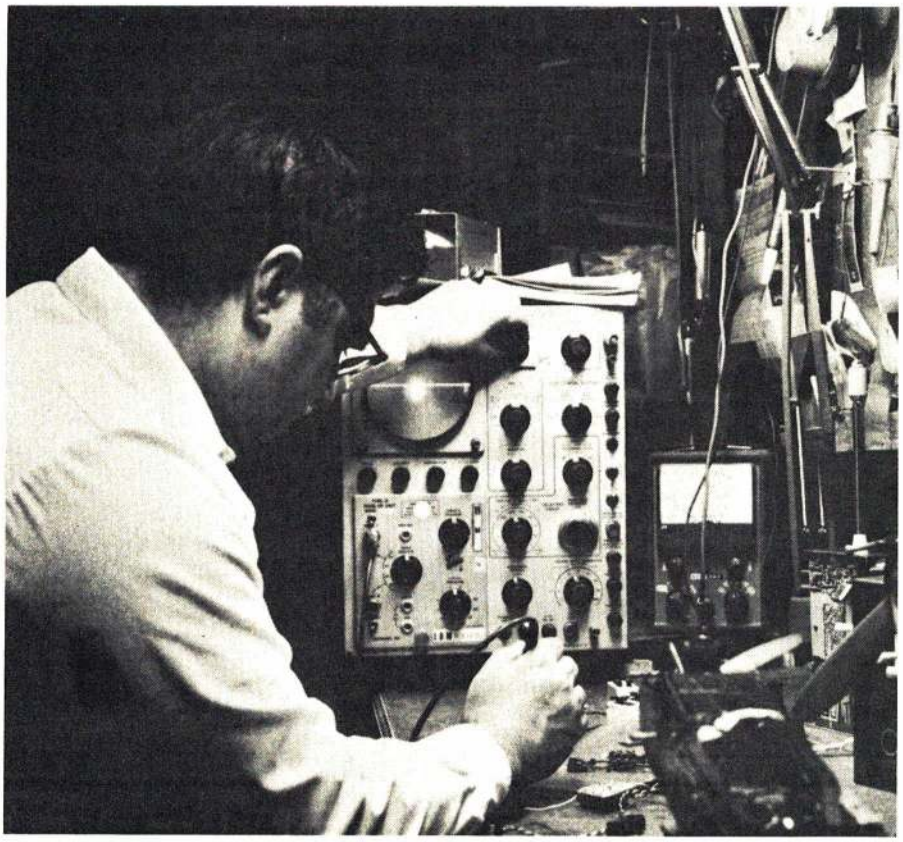
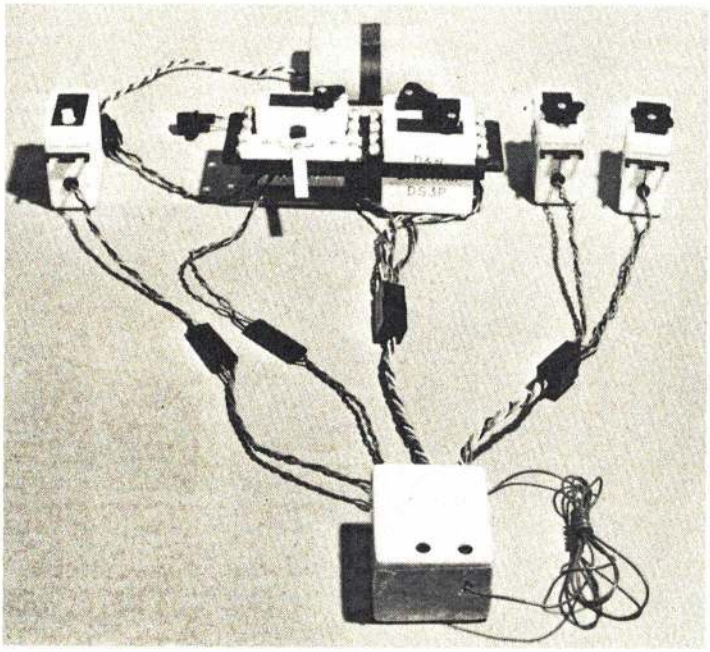
AAM 8-CHANNEL COMMANDER RECEIVER/DECODER



Receiver/decoder with D&R connector system, six servos shown, 500 mah Kraft battery pack, D&R servo tray. Plastic receiver box from ACE R/C. Plugs set up for two more servos.



Photos by Frank Pierce

In the April through July 1972 issues of **AAM**, Parts I to IV of the AAM Commander series were presented for a complete two-channel digital system based on the maximum use of integrated circuits. We have been pleased with the excellent response to the system as voiced in over 300 letters with questions, suggestions and compliments. It is almost astounding that only one letter has been negative—from a fellow who criticized us soundly for designing a system which required "unilateralization," whatever in heaven's name that may be!

One of the items promised in that original series was a conversion to a decoder which could function with transmitters having from one to eight channels. Numerous letters have been received asking for that promised article.

Receiver Design

The first order of action is for the reader to review the information for the original receiver and decoder presented in Parts I-IV. Alternately, one may purchase (from ACE R/C, Higginsville, Mo. 64037) a complete set of instructions developed from the original articles. The descriptions to follow will refer to those original articles. The receiver and decoder designs will be described. First the instructions for starting from scratch will be given, and finally the steps necessary to modify the existing two-channel receiver-decoder.

Receiver-Decoder Design

The description of the receiver is the same as for the two-channel receiver up to the description of functions performed beyond Q5. In the original receiver description, ending with "All the remaining circuitry between the output of Q2 and the output of T3 constitutes the IF circuitry (commonly called the IF strip)."

The original block diagram for the receiver is unchanged. However, the new schematic diagram (Figure 1) reflects the changes made. They are as follows: (1) Q6 and its associated components have been moved to the decoder board so that (2) a limiter network can be added to the receiver board plus relieving crowding of components on the output end of the receiver board; and (3) a voltage regulator has been added to replace the original RC filtering of power supply to the receiver.

Functioning of the added new circuitry is as follows: The output from Q5 is coupled to a limiter stage consisting of D2, R21 and R22. The function of the limiter is twofold. It tends to limit the amplitude of the detected signal when the transmitter is close to the receiver and thus helps prevent over-

Maximum flexibility from ICs for operating with one to eight channels from current digital transmitters. Permits conversion of two-channel AAM Commander receiver/decoder or construction of new receiver/decoder.

FRED M. MARKS

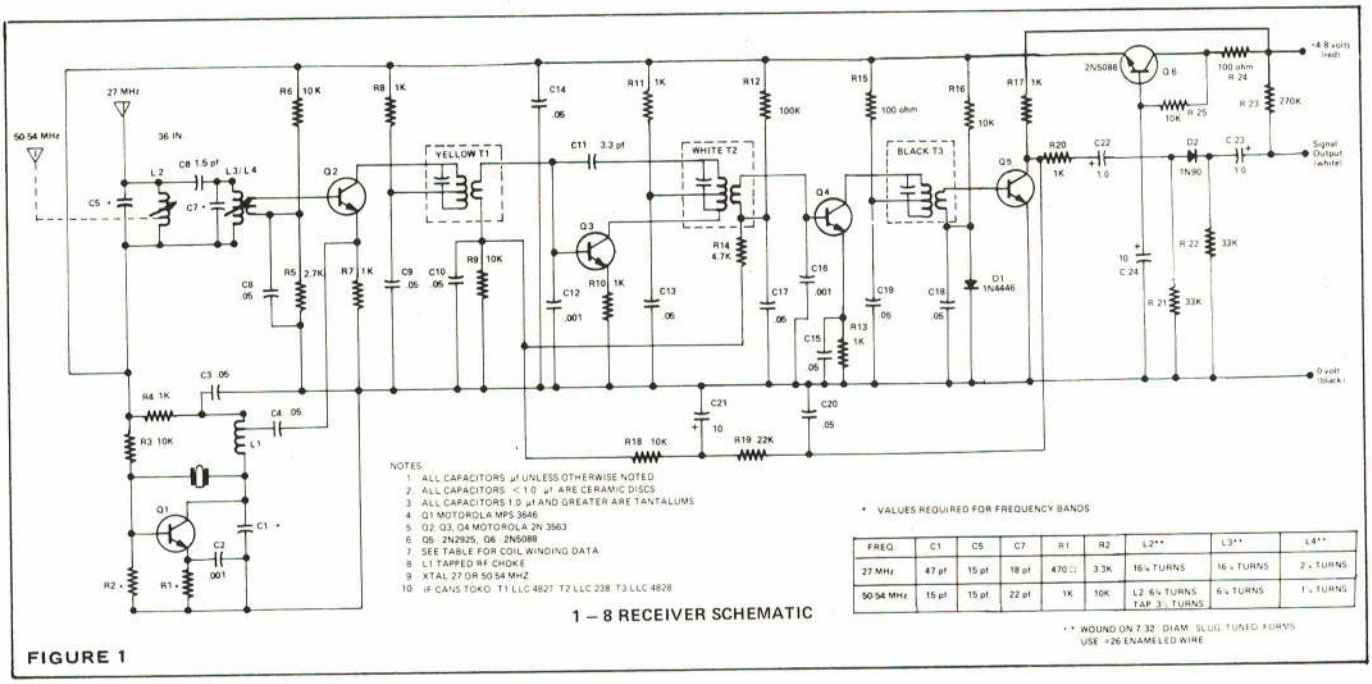


FIGURE 1

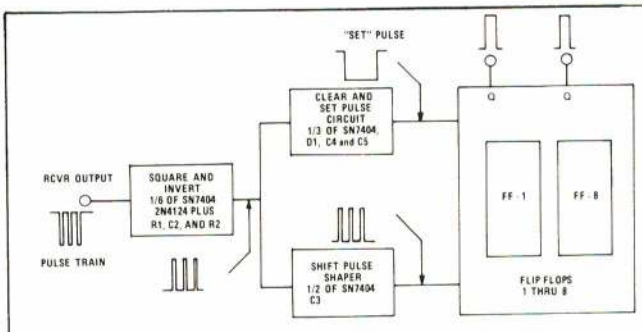
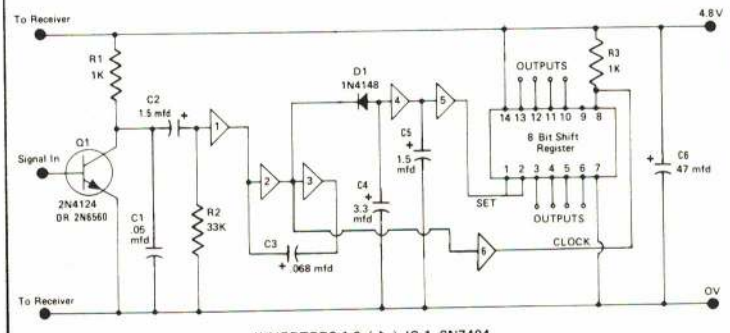


FIGURE 2

DECODER BLOCK DIAGRAM

FIGURE 3



INVERTERS 1-6 (D) IC-1, SN7404
8-BIT SHIFT REGISTER–DM/SN74L164N

DECODER SCHEMATIC

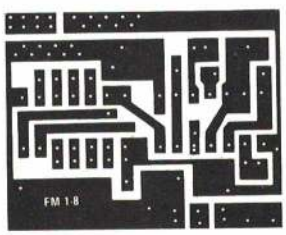
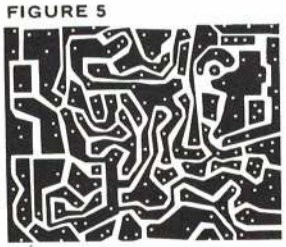


FIGURE 4

FIGURE 5



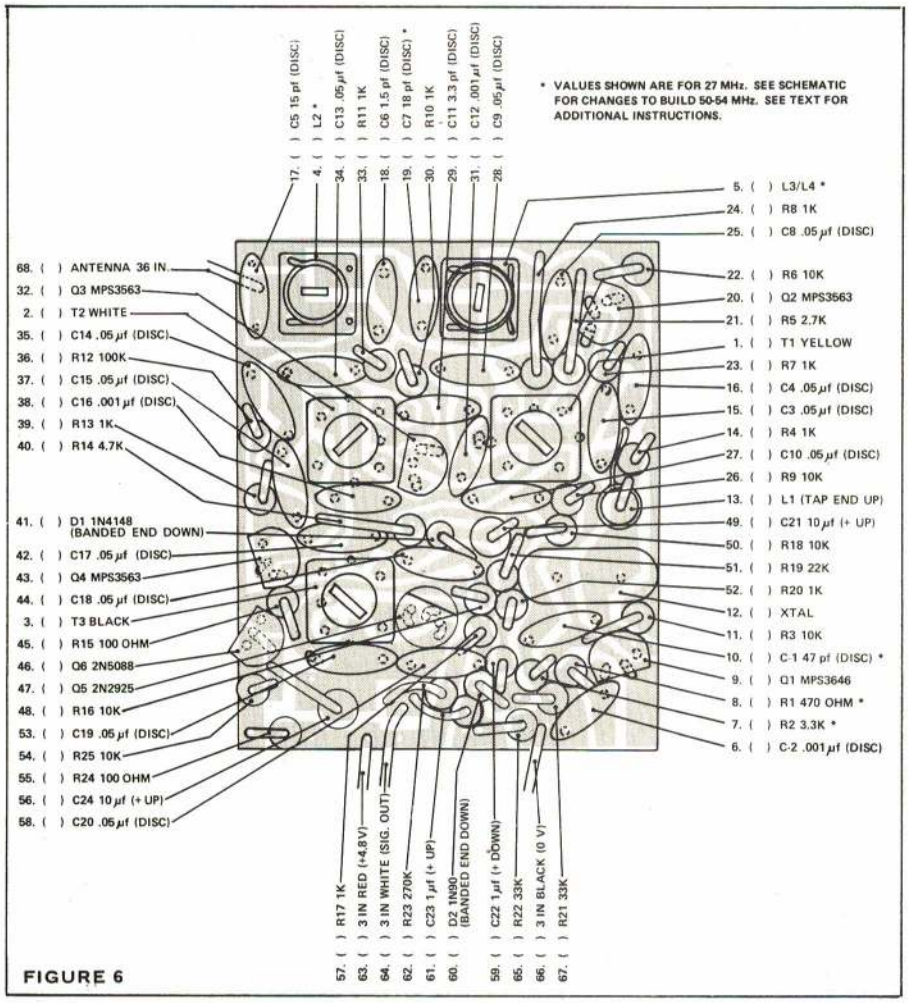
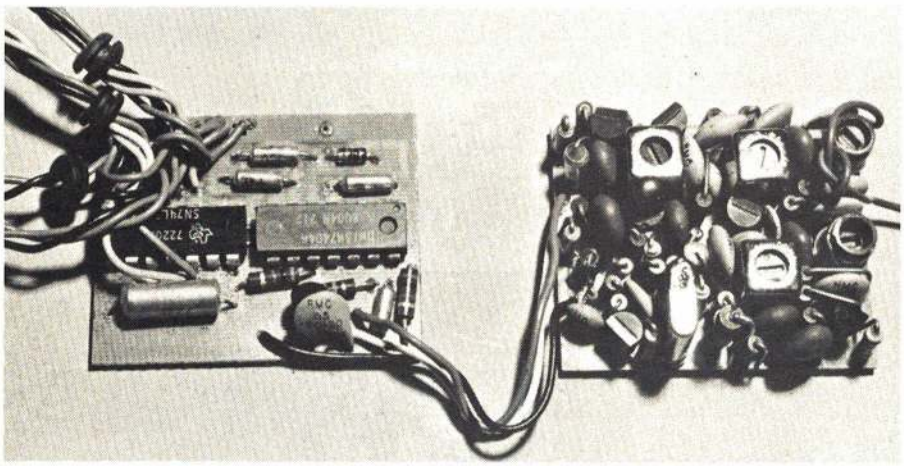
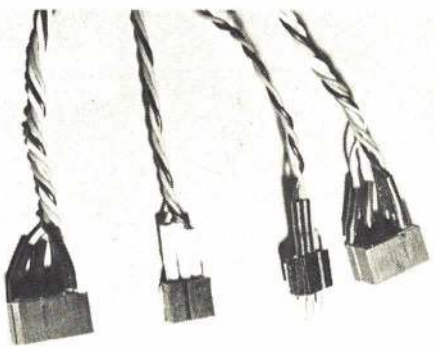


FIGURE 6





Above: Receiver/decoder. Modified two-channel and one- to eight-channel exactly same. Right: Deans block connectors are applicable, two blocks for six channels, two individual connectors for extra channels and power.

loading. More importantly, it "clips" noise spikes which could occur under low signal conditions resulting in servo jitter. The net result is that the receiver output remains "clear" to maximum range, then cuts off sharply. This is also important in the rejection of strong adjacent channel signals. The output from the limiter stage is then fed to the decoder board.

For the 1-8 receiver, we feel that the added complexity of a voltage regulator/active filter for the receiver is justified. Actually, no more components are required, but one active component (the transistor) is added.

The filter/regulator functions as follows. The transistor (Q6) is forward biased to a specific level, via R25, in the static condition. Under these static conditions (which actually occur only when the receiver is on without any incoming signal), capacitor C-24 charges to supply level. However, in the presence of a fluctuating supply voltage (which is almost all the time), the capacitor tends to charge and discharge through the transistor to maintain equilibrium voltage. In so doing, the transistor adds such gain that the apparent value of the capacitor is many times the actual value. The performance observed under test is that the regulator maintains receiver voltage within 10-15 millivolts of the desired level with pulsed fluctuations of up to 150 millivolts in the supply line.

Over the past few months, valuable additional experience has been gained with the receiver. It has been found that the performance margin of the receiver is such that one may obtain range well beyond line-of-sight when the receiver yields a ground range of as little as 10 to 12 feet with the transmitter antenna removed. However, it is always best to have the originally stated ground range of 12 to 15 feet under those conditions. Further, no problems have been encountered with AGC instability under any conditions.

The above is given as an introduction to the following information. The regulated receiver voltage and the loading resistors for Q3 and Q4, R10 and R13, play an important role in receiver design. Providing the margin of performance discussed above permits the builder to optimize the receiver to his particular use.

One may desire to operate the system on 3.6 volts for moderate range and extremely light weight. In that case, R24 may be jumpered and R10 and R13 reduced to 820 ohms. In the event that a receiver set up for 4.8 volt operation gives less than the desired 12 to 15 feet minimum range with the antenna off, those same changes could be made. However, this should not be done indiscrimminately because such a problem is likely to be the result of a faulty component. The reason for this statement is that most of the 20 or so receivers the author has tuned yielded a range of over 25 feet with the transmitter antenna removed.

Decoder Design

As indicated earlier, some of the receiver pulse amplification has been

(Continued on page 82)

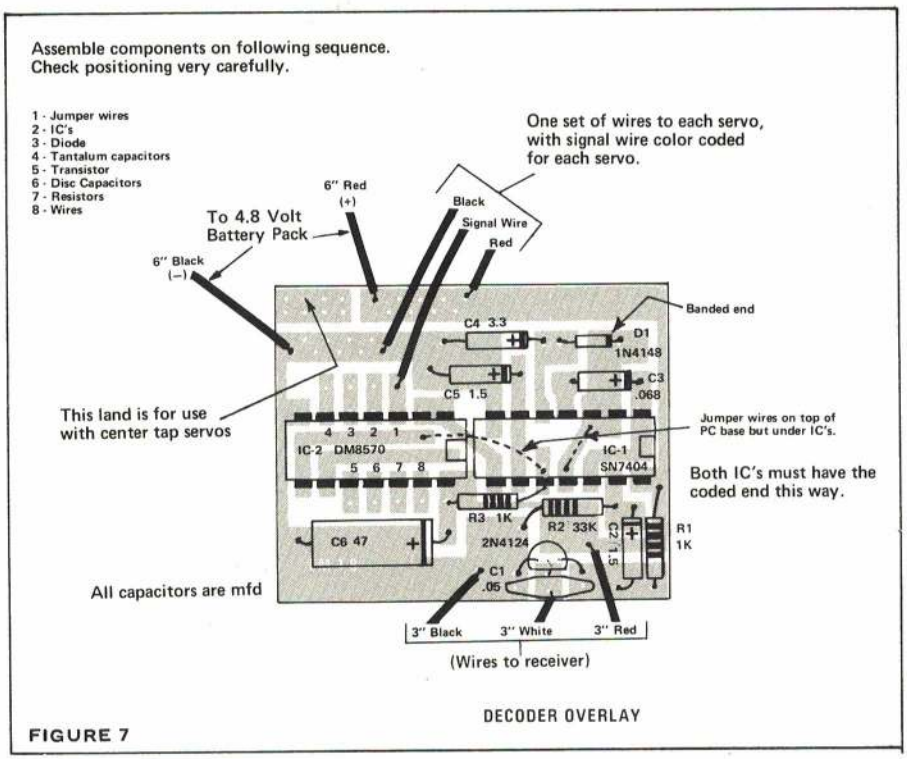
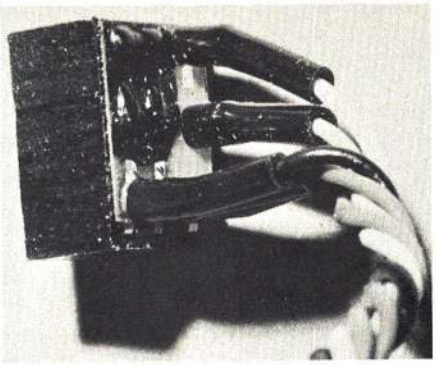
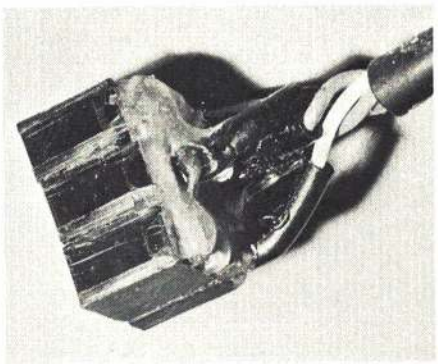


FIGURE 7



Above: Construction of Deans block connector. Gold pins. Quite reliable. Below: Conversion of single three- or four-pin Deans connectors to block. Silicone rubber or hot-melt glue excellent for insulation.



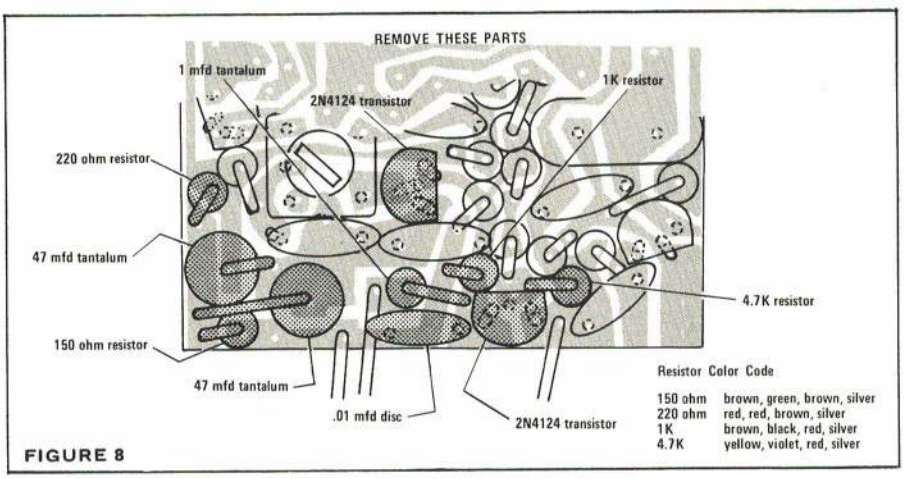


FIGURE 8

FIGURE 9

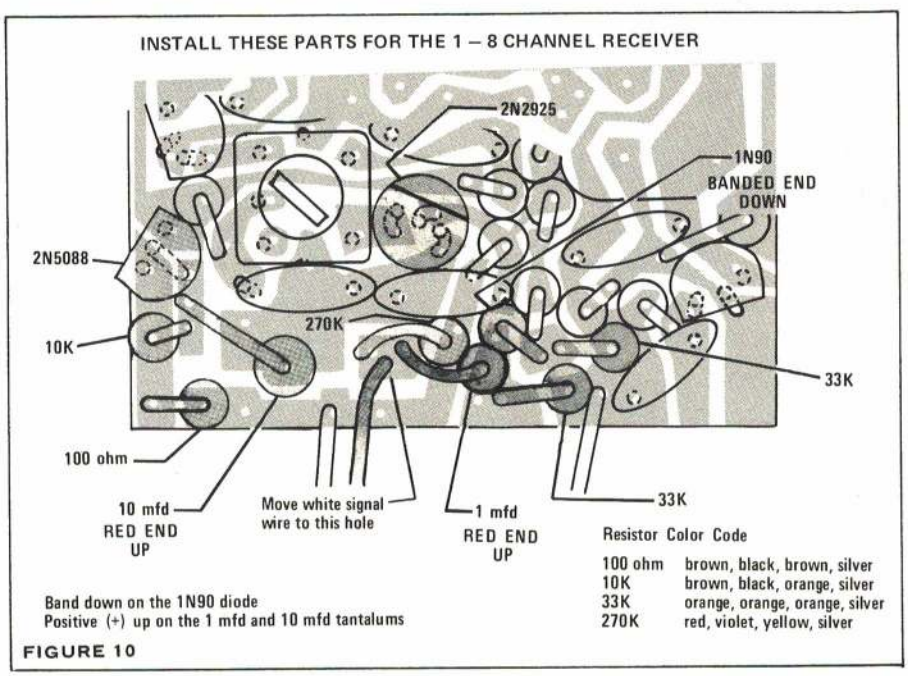


FIGURE 10

TABLE 1: 1-8 RECEIVER/DECODER CONVERSION PARTS LIST

*( )	1	Decoder Printed Circuit Board
*( )	1	1N90 Diode
*( )	1	2N5088 Transistor
*( )	1	2N2925 Transistor
( )	1	DM/SN74164N or DM8570
( )	1	.05 mfd Disc Capacitor
( )	1	.47 mfd Tantalum Capacitor
( )	1	10 mfd Tantalum Capacitor
*( )	1	100 ohm, ¼W Resistor (brown, black, brown, silver)
( )	1	1K, ¼W Resistor (brown, black, red, silver)
*( )	1	10K, ¼W Resistor (brown, black, orange, silver)
*( )	2	33K, ¼W Resistor (orange, orange, orange, silver)
*( )	1	270K, ¼W Resistor (red, violet, yellow, silver)

*Changes in receiver components parts list published with original receiver.

JOHN SMITH ON CL

More on Sonic Cleaning: Since mentioning sonic cleaning of engines and parts a few months ago, the mails have brought letters from many saying they are now cleaning engines this way and are amazed at the results. A letter from Franny's Chrome (513 Vesta Pl., Hyde Park, Reading, Pa. 19605) says that he is handling sonic cleaning machines. An enclosed brochure covered nine different models of machines made by the Branson Instruments Co. (Stamford, Conn. 06904). Their model B-12 with a tank size of 5 x 5 x 3" sells for $70 and should do a great job on parts. The next size, a 5 x 9 x 4" tank that will take complete engines, sells for $115 and is model B-220. While the prices may be out of reach for some of you, a club could purchase a machine and charge a small fee to club members to clean engines. These are quality built cleaners and have many accessories that can be bought to make them even better. If you would want to own one for yourself, and the wife thinks it's too much loot, explain to her that they also do a really fine job on cleaning jewelry, silverware, etc. Write Franny for more details.

What's in a Name?: 1/2 A sizes. Ever have someone who isn't in the hobby come up to you and ask about engine classification? It sometimes goes like this:

"What determines engine classification?"
"Well, we use displacement to determine it. 1/2A is 049 and Class A is 1525 and. . . ."
"Wait a minute, you said A is 1525 and 1/2A is 049?"
"Er, yea."
"Why is 1/2A less than one third A size?"
"Good question. I don't know, someone just called it that."

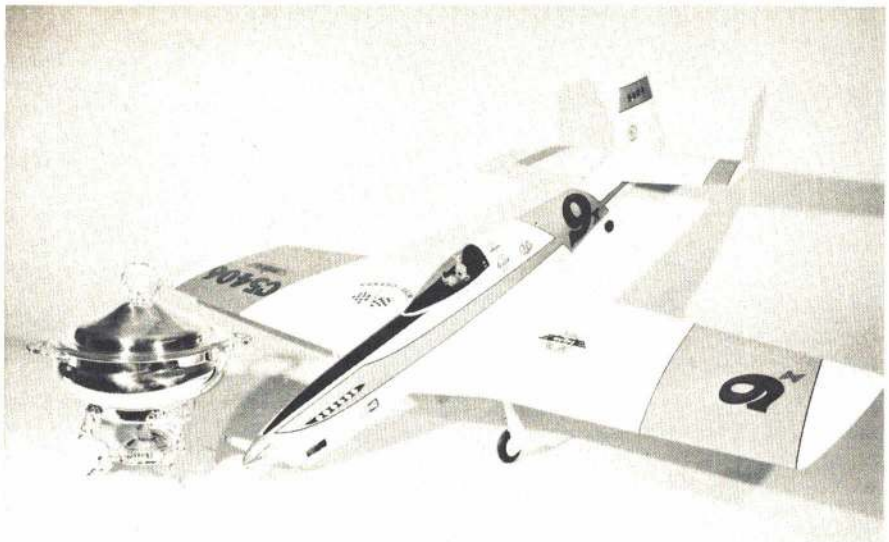
Why do we call it 1/2A? To me it sounds toy-like. Why don't we call it A/2? Why do I bring this up? Just to give you guys out there something to talk about during your hangar sessions.

More on 1/2A (Or A/2): A letter from Dubby Jett tells of the activity down Texas way. Dub is running his new homemade 049 with much success having turned 109-108-109 mph at the Labor Day meet in Dallas. This was without the pipe. Since running the pipe, he has increased rpms by some 2000. The engine is a rear rotary valve setup, using a TD piston and rod in a home-built cylinder. The pipe is a constant diameter unit using no expansion chamber. By the way, the new Cox TDs will be recognizable from the older engines by the fine screen covering the intake. This is the only outside change that we have seen. Dub also mentions that the Kosmic 15s are being run in Texas with a couple really turning on. Shelton-Harris, S&H Green Stamp Team, turned 165-plus with one at the Dallas meet.

I have also been getting returns from many clubs on the Formula V or 1/2A Mouse racing. This seems to be the big thing in many areas as more and more clubs are picking up the idea that fun things come in small packages. And, it seems as if there are as many ideas about rules as there are clubs. The only nationwide trend is that they use 1/2A engines (the class of the event)! Some fly on dacron line, some on stranded, some on solid. Lengths run from 35 to 42 ft. Some use 3/4" scale Goodyear, some 1" scale Goodyear. Some TDs, some Babe Bees. Pressure and no pressure. It all boils down to one thing, everybody is flying them, they are all having fun, Juniors are coming out of the woodwork to compete. Now all we need is a set of rules that everybody can abide by. Anyone want to act as a clearing house to gather this information so it can be passed on to all interested?

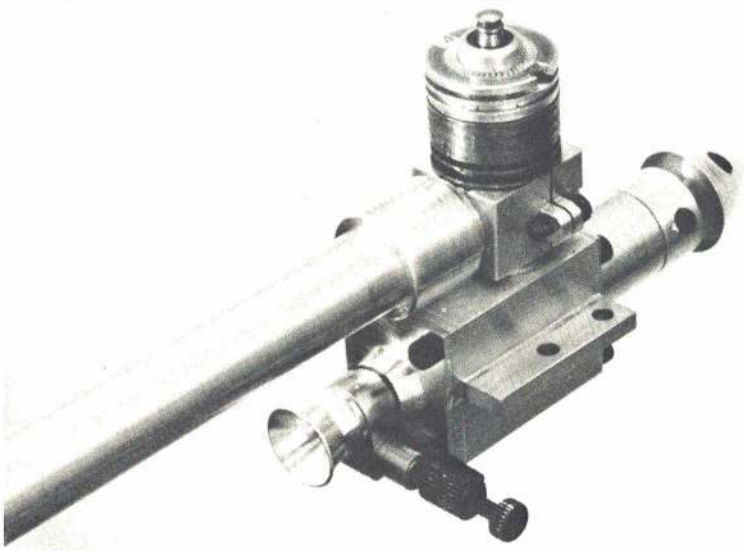
And More Slow Rat Racing: The Aeromasters MAC (Rt. 1, Box 199-D, Severna Park, Md. 21146) sent their Slow Rat rules to me—.36 engine, 300 sq. in. on the wing, racing as per section 16, AMA Rule Book. They also run Mouse racing in two classes: Class I is reed valve, Class II is TDs, with no restrictions on plane design except it must ROG on at least one wheel.

If you have been reading this column for the last year or so you will have seen all the comments on new and different types of competition being started all over the country. What I'm leading up to is this: I believe that now, more than ever, there is a need for a National Control Line Society. There are many more reasons why such an organization should be formed, an important one being that such an organization will give us a bigger voice in AMA matters. RC and FF are heard from, why not us? Maybe this year at the NATS we should make an effort to get together to get a group organized. Let's try it.



Second place in the Pylon category at Toledo is Basil Derrough's P-51 which he calls "Miss Canada." Basil leads the action in Canada in Pylon Racing.

Homebuilt 049 by Dubby Jett uses some Cox parts but is a pure speed motor with ball bearings, rear rotary valve intake, and a neat semi-tuned pipe.



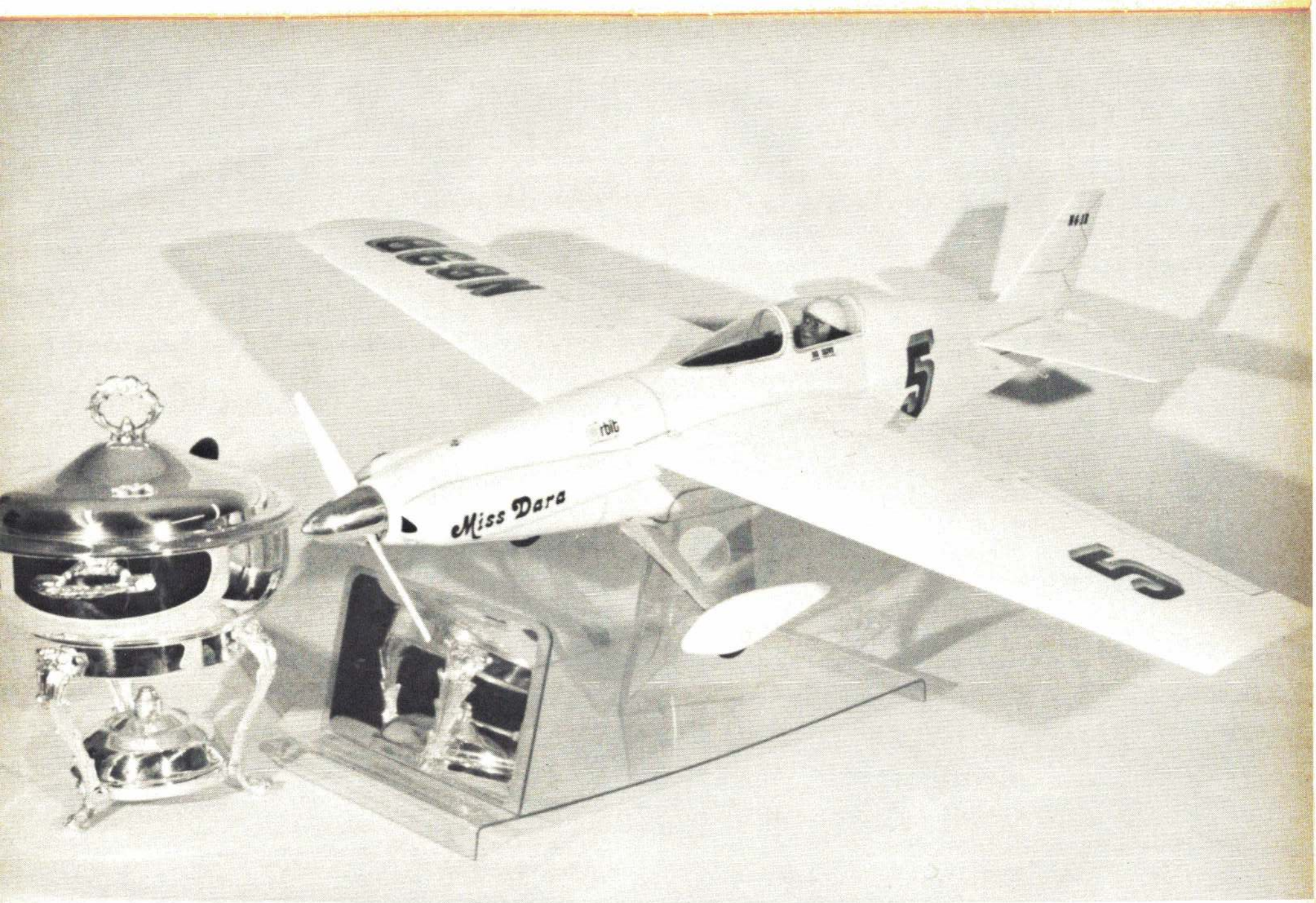
BOB STOCKWELL ON RC

Southern California Survey: As in 1970, 1971 and 1972, the new season for 1973 in Southern California has been initiated by a questionnaire. This one was formulated by Chuck Smith, 1973 NMPRA Vice-President for the Southern California area. Since these questions reflect very well the matters of burning interest to fliers in the most active district of pylon racing in the U.S., it is not unlikely that at least some of them will also be of general interest across the country. Though these decisions will be made and already implemented by the time you read this, it may be that you will have opinions you would like to send to **AAM.**

Chuck's first question deals with the formation of two classes, Expert (under 1:40) and Novice, in Formula I. The division would be made on a voluntary basis, with a committee to resolve disputes. His second question would establish a system by which novices could move up to the expert class. His third question relates to the problem of who would race against whom: Should the two classes fly in the same heats or not? His fourth question relates merely to the names of the classes: "Expert"/"Novice," Class I/II, 1st/2nd Division. His fifth question takes up the touchy issue of point standings: He proposes that the top novice would accumulate points as though he had finished just below the bottom expert in the district system, and only the "expert" points would count in national standings. Since district point standings will determine who gets to race in the NMPRA National Championship Races over Thanksgiving (most likely), I anticipate that Chuck will get a lot of flack on that proposal, or otherwise only a tiny percentage of entries will declare themselves in the novice class.

I will skip some questions of purely local interest. But one of major national import has to do with limiting the speed in some way that would keep the times above 1:20. First, should limitations be imposed? I will be very curious to see how the Southern Californians vote—I'll tell you next month. Chuck next asks *what* restrictions, assuming the preceding vote is favorable, should be imposed: Strictly stock engines, claiming races, 11 in. props, idle requirement, restricted fuel, restricted carburetor intake, or what? Chuck also asks how many Southern Cal. contests should count (e.g., five of seven, six of seven, or what?) toward District Championships. And finally he raises the crucial question that is peculiar to Southern Cal. because of the large entries, namely, shall we allow only 25% of entries on any one frequency, by priority based on postmarks of entry forms?

It will be interesting to see how the fellows vote on these questions: There was a tremendous amount of discussion last year about slowing them down, about how to solve the problem of getting in enough racing at some of our huge contests, about racing expert against expert, and so on. I'll let you know next month how the responses went.



"Miss DARA." Finish—pearl base acrylic lacquer paint; Power—HP-40RR. First Place Pylon, by Bob Brown

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10G15—Baby System	$69.95
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10G16—Standard System	$71.95
10G17—Stomper System	$74.95

26.995, 27.045, 27.095, 27.145, 27.195
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NOTE--Here are the new weights for the new model of the Pulse Commander. For the Baby, weight is 2.5 ounces, Baby Twin, 2.7 ounces, Standard, 3.7 ounces, Stomper, 4.1 ounces.

Canadian Commander Customers

All Canadian customers for the Commander series of Pulse or Digital Units should contact H & W Enterprises at Box 972, Regina Sask., Canada S4P 3B2

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Highly Recommended for Beginners

† 34" Foam Wing sections. † Top grade die-cut wood parts. † For .020 engines. † Commander Baby or Baby Twin. *Owen Kampen design.

13L100—Dick's Dream Kit $6.95

ACE HIGH GLIDER KIT

† 70" Foam Wing sections. † Precision machine cut and sanded wood. † For .049--Power Pod parts supplied. † Recommended for Rudder-Only--Standard or Stomper. *Owen Kampen design.

13L104—Ace High Glider Kit $14.95

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A Goodyear scale type racer for the experienced rudder only flyer. † 30" foam wing. † Top grade machine cut sanded wood. † For TD .020. † Baby Twin Pulse Commander recommended. * Owen Kampen designed.

No. 13L103—Skampy Kit $6.95

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† 50" Foam Wing, 3 Moulded Sections. † Precision machine cut and sanded wood. † For .049. † 2 Channel Trainer, use with bricks or servos. † Works beautifully as Rudder-Only Pulse Proportional ship with Commander-Standard or Stomper.

13L106—2T Foam Wing Airplane Kit $14.75

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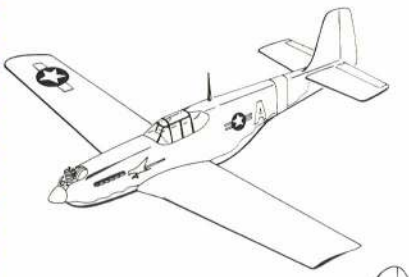
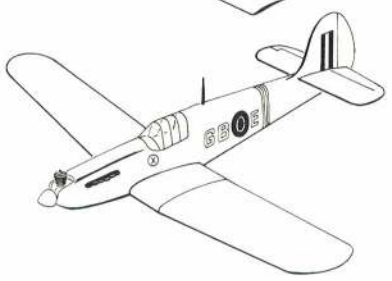
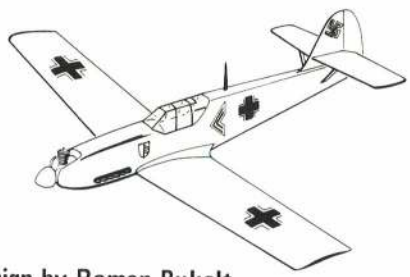
WARBIRDS







Design by Roman Bukolt

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Choose the WW II Semi-Scale bird you'd like to build--the Ace kit will make it a pleasure.

Kit contains precision band sawed and machine sanded balsa and hardwood parts. Some portions of the wood is blank to let you make the variations required for model of your choice. This makes the flexibility to allow you to choose one of the three possible designs. Step by step details are shown on the plans.

Kit features the use of Ace Foam wing--two taper sections, and a constant section--to make for easy construction of any of the three wing configurations.

Each War Bird has a span of 42" and an area of 225 square inches. Designed for docile performance with a Cox Babe Bee or Golden Bee and Pulse Commander Rudder Only. Or use a Tee Dee .049 with a 2 channel digital for commanding characteristics. One secret to the War Bird is: Do NOT over power--for scale-like and realistic flying.

No. 13L110—Ace War Bird Kit $17.95

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* Two channel system using IC's and latest state of the art; may be expanded to 4-6-8 channels.
* Receiver-Decoder (2) will work with most modern 4-6-8 channel digital transmitters on same frequency! Reads aileron and elevator signals--ignores the rest.
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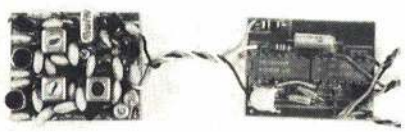
* Receiver-Decoder (2) offer inexpensive way to go with your present system for glider, plane, boat or car: use with extra servos you already have. Or use our combo flite pak: receiver-decoder, two servos, etc.
  * Available on the following frequencies: 27.995, 27.045, 27.095, 27.145, 27.195 53.100, 53.200, 53.300, 53.400, 53.500



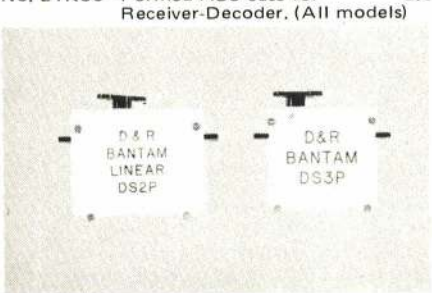
digital commander RECEIVER DECODER (2) KIT

IC's simplify wiring and set up of 2 channel decoder. Receiver is exceptional double tuned front end which uses discrete components for the highest selectivity and greatest range. Complete with detailed step by step instructions. Weight of completed receiver-decoder is 36 grams or 1.26 ounces.

No. 12G20—Digital Commander Receiver-Decoder Kit (2) $27.95
(Less case, connectors, switch)

Please specify frequency

No. 19L50—Deans 4 pin connector set .95
No. 40L252—CW DPDT Slide Switch .59
No. 30L21—Switch Guard for above .39
No. 21K30—Formed ABS case for Receiver-Decoder. (All models) 2.00



digital commander SERVO KIT

Housed in the D & R Bantam DS3P mechanics, uses WE 3141 IC for ease in assembly. Kit contains motor, pot, wiper and all components required, with step-by-step manual.

Weight for the DS3P servo is 37 grams: 1.3 ounces. With the DS2P servo, 44 grams: 1.55 oz.

No. 14G20—Digital Commander Servo Kit $19.95
No. 14G20L—As above, except with D & R DS2P Linear Mechanics (Less connectors) $20.95

digital commander FLITE PAK KIT COMBO (2)

If you intend to use Commander Digital (2) with your multi digital transmitter, all you need are the receiver-decoder and 2 servo kits. Combo offers savings over kits purchased individually. Includes 3 connectors, switch, hookup wire for cabling. Everything you need to make complete 2 channel-2 servo pack for your sailplane, boat or car, except batteries.

Weight of the complete 2 channel Flite Pak, including ABS case and connectors and switch, but less batteries, is 113 grams or 3.9 ounces.

With 225 ma SCL batteries, 160 grams or 5.64 ounces.

As above, but with 450 ma SCL batteries, 190 grams or 6.7 ounces.

No. 12G30—(2) Flite Pak Combo $59.95
No. 12G30L—As above, but with D & R DS2P Linear Mechanics 61.95

Please specify frequency

PIGGY BACK 4 CHANNEL RECEIVER CONVERSION KIT

If you've been successfully using your Ace Digital Commander 2 channel receiver-decoder combination, you can inexpensively convert this to 4 channel operation for use with your 4,5,6 or 8 channel digital transmitter.

The conversion consists simply of adding another IC, and "piggy backing" it on top of the present IC 2 channel unit.

Our piggy back conversion kit contains the additional IC, complete instructions, and extra hook-up wire. No connectors are furnished. You can go with additional Deans 4 pin units as used in the original 2 channel units, or go deluxe and use the new Deans or D & R Block type connectors.

No. 12K22—Digital Commander Piggy Back 4 Channel Conversion Kit $3.25

digital commander 4-6-8 CONVERSION KIT

You have been asking for this--a kit to let you convert your Digital Commander receiver and 2 channel decoder or 2 channel Flite Pak to more channels. Here it is!

The 4-6-8 Decoder requires a new PC board, new IC and some additional components. Simple to wire. An 8 bit chip is used (Cost is a bit more than a 4) but you are not limited to just a 4 channel expansion. You can go up to 8, if your transmitter will!

Use your Digital Commander Flite Pak for 1, 2, 3, 4, 5, 6, 7 or 8 channels--depending on your transmitter. Unused signals are simply ignored.

Kit consists of basic components. New IC, PC board, all other required electronic components with complete instructions. No connectors supplied.

No. 12G8—4-6-8 Channel Conversion Kit $12.95

ALL STAR

BIPLANE KIT BY ROMAN BUKOLT

Uses two sets of Ace Foam Wings for ease of building. For use with .09 to .15 power and 2 or 3 channel digital. Do NOT overpower! Beautiful Experimental Aircraft Association type plane.

131200—All Star Deluxe Biplane Kit $21.95

Add Another Command!--

Ace Digi-POD SERVO

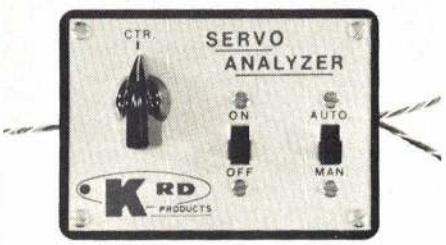
Been wishing you had another function with your 2 channel digital? It's simple and easy with the Ace Digi-POD servo.

The Digi-POD is a pulse omission unit, which is triggered when the pulse train from your digital transmitter is interrupted approximately .25 seconds. Is a 3 position sequencing device, going from one position to the next. Response is smooth and quick. Easily hooked up to either of your existing servos.

Transmitter modification is simple and full instructions are supplied for the Commander Digital 2 along with a simple kit of needed parts. NOTE: Kit also contains theory and procedure to enable experienced to make transmitter mods on Kraft and EK bricks, World Engines and units they manufacture under "house labels" for Hobby Lobby, Hobby Shack Cirrus, etc. Factory conversion of your transmitter is also available at nominal cost.

The Ace Digi-POD is available only as a completely assembled unit. Housed in D & R Bantam case. Weighs 39 grams, less connector.

No. 15G3—Assembled Digi-POD Servo $28.95
No. 11G2—Digi-POD Parts and Instructions for Transmitter Conversion 1.75
No. 11E3—Digi-POD Factory Conversion of your Transmitter. 6.00



KRD SERVO ANALYZER

Designed to check and adjust any three or four wire, negative or positive, servo. Comes adjusted to operate servos that use a 1 to 2 mSEC time base with 1½ mSEC center. Takes care of majority of servos on market. Simple adjustment required to operate other servos requiring different time base.

In manual position, pointer knob may be used to check servo centering and travel, binding or dead spots, throughout its travel. This may also be used while installing servos in your airplane without using transmitter and receiver.

In auto position, analyzer will drive servo back and forth from one end of travel to other automatically. This is useful for breaking in new servos, motors and gears.

No. 31K19—KRD Servo Analyzer $24.95

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DON LOWE ON RC

Tangerine Meet, Orlando Florida: The fourth annual Tangerine affair in Orlando was held during four days of beautiful sunshine. For us northerners it was a great respite from cold weather and for all it was terrific competition.

Pattern, Formula I Pylon, Stand-off and AMA Scale provided something for everybody and attracted the very best. They came from California, the Midwest, New England, and Canada as well as the South. For some it was a combination vacation for the family—taking in Disneyworld, the sunshine and RC competition.

Pattern was spiced by names like Chidgey, Page, Grier, Whitley, Martin, Christianson (Canadian National Champion), Dave Brown, Rhett Miller, Don Lowe (who's he?) and many others. There were over 80 total competitors in the contest.

Formula I generated a real shootout between California's Terry Prather, Bob Smith, Johnny Brodbeck, Jeff Bertken; World champs Cliff Telford and Bob Violett; Vern Smith, Marvin Kowaulski and the Southland's best. Formula I had over 40 competitors!

Stand-off and AMA Scale were well attended with Ed Izzo beating them out in Stand-off with a beautiful P-40 (original) and Walt Moucha in AMA Scale with his world-reknown "Fly Baby."

Class D Expert Pattern was a dogfight from the start with yours truly taking an early lead but getting nosed out (third) in the end by Norm Page (first) and Daddy Rabbit Whitley (second). Chidgey and Christianson finished fourth and fifth, with the *very* young Rhett Miller finishing sixth. Page looks strong for the world championships—was defeated only twice in 1972. Understand that he also won the '73 Phoenix meet.

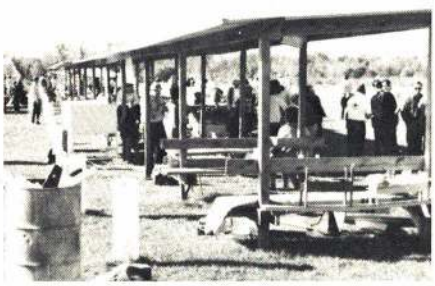
Formula I showed absolutely top-notch competition with Terry (ST) Prather doing it with perfect heats and Bob Smith second. The race between Terry and Bob was something to see with Bob cutting twice to lose the heat. Times were fantastic with several in the 1:20s (1:30s were common). Prather proved that the Tigre isn't dead when tweaked right, although the K&B Schnuerle looks mighty strong.

Jimmy Martin pleased the customers by demonstrations with his Kalt helicopter and even I got in a few licks with my Whirlybird. Jim flies the Kalt like his Banshee—low and fast!

Above: Jim Martin flew his Kalt for demonstrations. Here it is lined up with the Stand-Off Scale entries. He flies it like a Banshee. Below: Ed Izzo has a fine Stand-Off Scale P-40 homebuilt. Won first place at Orlando.

The Orlando Club is to be congratulated for a terrific contest. Their beautiful (soon to be lost) flying site, and innovations, such as pattern frames for the aerobatic judges and automatic lap and finish display unit for pylon, were much appreciated. Even the surrounding swamp area had its share of the limelight when our friend "Schultzie" staggered back triumphant with his lost bird after two hours of defying snakes, spiders, alligators and what else?! There was also a poor rat that did the deep six when konked by an out-of-control Formula I! Or, how about Ed Weitke folding the wing on his Minnow, picking up the pieces and, with much five-minute glue, continuing the fray!? And the continued hard luck of Bob Violett at this contest, folding the wing of his beautiful Cosmic Wind. Last, but certainly not least, yours truly continuing my mid-air thing by wiping out my number one ship in a mid-air during practice!

Above: Ron Weinsch carries his model on the airliner. Would you believe a half-size Phoenix—it is a bomb. Yes, it was flown too. Below: Over forty entries in Pylon Racing.



Above: Shelter is needed to beat the summertime heat in Orlando. Below: Pattern judges were supplied square frames.

AL RABE ON CL

Ever wonder why nearly all control line stunt models are monoplanes? They are either scalish, futuristic, classical, or non-descript single lifting surface designs. It had been assumed by most modelers that biplanes, twins, jets, or flying wings would not be useful in competition stunt. Well something is beginning to happen. A number of modelers have been trying biplanes. Some perform well and some still need refinement. Al Rabe, your correspondent, dug into the happenings and presents this development on page 38 of this issue. Don't miss it. It was much to interesting to condense for column presentation! —Ed.

Rules: During the winter of 1969 the CL Contest Board passed a rule requiring the use of "safety thongs" which tie CL fliers to their handles. The final version of this rule was considerably "watered down" to exclude Rat and Combat fliers who, in the interest of safety, must be able to pass their handles from hand to hand while flying in traffic at 100 mph plus. Considering this, it seemed that a well-documented effort by stunt fliers should ear a similar exemption for our lightly constructed, slow flying stunt ships. To this end, I circulated a questionaire to all top Stunt fliers including our entire FAI Team and all, recent Nats winners and finalists. The results, showing 47 against two for the thong were forwarded to AMA Hq. in Washington. Our request for exemption was denied on the basis that the thong was a "safety" rule and that no one suffered a competitive disadvantage as long as all competitors were "similiarly handicapped" (CLCB's words).

At the 1972 Nats, Stunt fliers met to discuss rules and decided to try again to rid ourselves of this irritating nuisance.

First, there was absolutely no need to apply this rule to persons flying relatively slow or light airplanes. There have been no reports of serious accidents from stunt or sport flying or insurance claims which could have been prevented by use of a thong.

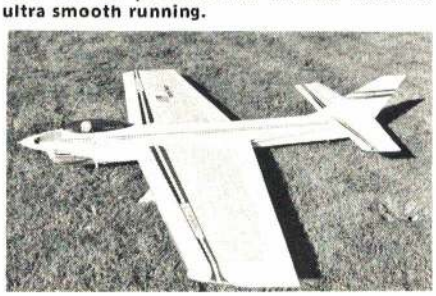
Second, 95% of the stunt fliers object strongly to *required* use of the thong. Sport fliers simple ignore it.

Third, the thong requirement was atcually a CLCB attempt to reach the vast majority of CL fliers who don't compete to encourage them to become safety-conscious thong users. Making rules which directly affect competition fliers only is a lousy, inefficient way to reach the sport fliers. The attempt was a dismal failure.

Fourth, ask your local CLCB member how much your AMA insurance was worth last Sunday while you were flying your Ringmaster in the local school yard without a thong.

The board must reconsider their requirement that thongs be used by people who obviously don't need them. CL fliers should not have their AMA insurance jeopardized by this ill-considered, unnecessary and unpopular requirement. Our hobby will be encouraged by elimination of such needless irritations.

The Avenger 35 by Don Shultz spans 59" and weighs only 45 oz. O.S. 35-powered model uses muffler pressure and uniflow tank for ultra smooth running.



AEROMASTER Mk III, Second Place Finish (MonoKote) and Sport Biplane, by Andrew Zoph

BIPES FOR STUNT

A competition Stunt biplane is possible. It would need to be a bit large, have thin wings, use a hefty engine and perhaps not need flaps. / by Al Rabe

Jean Pailet's much altered Grumman Ag-Cat.

Jack Sheeks evaluated the biplane as a shape and concluded that a modified Stagger Wing Beech was the way to go. A handsome plane.

In response to a request for information on biplane Stunt ships in my CL Stunt column, I have received some very interesting letters from Stunt fliers who have actually tried them. Three of the best letters represent an unusually broad cross section of modeling experience ranging from engineer to relative novice.

Jean Pailet, Controline Contest Board Chairman, wrote that his profile Ag-Cat was the prototype/flying test bed for a larger (1/10 scale, approx. 42" span) full fuselage, full stunt version.

The changes from a full-scale model of the Ag-Cat are: symmetrical airfoil, reduced wing chord, increased gap between the wings (supposed to reduce the interaction of one on the other), reduced wing stagger, no dihedral, a thinner (in plan view) fuselage, horizontal tail surface area slightly increased, and narrow, full-span, interconnected (by Kwik-Links) flaps on wings.

Flying characteristics of this larger model are quite similar to a smaller profile model—it will do any maneuver, but has a decided tendency to stall on tight corners. Because Jean did not feel that it could compete well with more conventional Stunt jobs, the Ag-Cat has been used exclusively in Scale events at local meets. Although it loses points in terms of true scale fidelity, its ability to perform virtually all of the flight maneuvers for which points are available far exceeds other "Scale" models, and so it regains a fair share of the "lost" points. It has generally placed in the top five at most local meets for the past eight years or so. The big thrill for the spectators is to see a "Scale model" fly inverted, perform loops, wingovers and eights. In answer to my specific questions, Jean wrote that he does think a larger engine plus a lower pitch prop might work, but the question he raises is will it work well enough? He suspects not, but says he may have been inspired to try a Fox 40 in his ship this year. On the built-up model, the wings are 16% thick, so they provide plenty of lift—maybe too much. Flaps *are* narrow with small deflection, so that's not the complete answer to drag. He doesn't think a biplane Stunt job can be built to compete on an equal basis with a conventional model.

Jack Sheeks, of Indianapolis, Indiana, wrote that the most successful biplane he ever had was the negative stagger Beechcraft. It was the result of the efforts of a group of Indianapolis modelers who wondered if bipes could fly well. They used everything from Flying Fool kits to profiles with stacked Nobler wings.

One problem they noticed was that their bipes tended to turn tighter inside than outside. They thought that the top wing might be cancelling out the bottom wing on outside maneuvers. After a couple of weeks of bull sessions, Jack decided that a negative stagger biplane might cure the turns problem and fly well. He felt that putting the bottom wing out in front of the top wing would help a bipe to turn outside, the rationale being that this would allow the bottom wing to enter the maneuver first and would maintain the airflow over the lifting surface. He built one, and it worked.

Mo Todd and Jack sort of sneaked out and flew it in the clear dope stage, which holds down the laughter in case it bombed. They were both delighted with its performance. The ship would fly the entire pattern. It had a slight wobble in tight corners which was later corrected by moving the wing struts to the tip rib, thus stabilizing the wing and moving the leadouts. They also made the leadouts adjustable which helped as the ship got heavier. By the time they painted the Beech, it weighed 52 oz. which is heavy for a Fox 35 and a 46-in. wingspan. By adding a little weight to the outboard wing tip (equal span panels) and nose weight, they succeeded in turning in some fairly decent patterns.

They wiped out the Beech four different times testing it (everyone flew it) and the last time Jack saw it, the ship was too heavy to be of much value but it was still doing its thing—stunting.

Jack doesn't claim that this is the only way to go, it's just the way he went to prove a point. Bipes will fly Stunt. Jack's wish is that someone with the engineering background to cope with problems would go all the way and prove this to the rest of the world.

To answer my specific questions Jack said he thinks that a bigger engine and prop might have helped, but in those days he didn't have a large variety to choose from. The Beech didn't slow much in the corners, but then drag was fairly low as he used little or no flaps. The Beech's strong points were its semi-scale appearance and characteristic of making very sharp corners. Looking back, he thinks that the Beechcraft's major weakness was lack of power. Wind didn't seem to present any unusual problems.

The third letter, from Wilbur Hinton, Liberty Center, Ohio, brought this remark: "Are you ever an answer to a prayer." He has been researching biplane stunt since 1965 with *much success.*, and thinks that a biplane *can* be competitive.

He confesses that his first 59-powered bipe was drawn to look nice and build easy. It did that, barn door wing and all. The first 59er had a top wingspan of 42". The bottom wing was 38". The original airfoils were not definite percentages that he calculated, but were symmetrical and designed to get more ribs out of a sheet of wood. Therefore, the ribs were one-in. thick before capstripping. Top wing chord was 11" and the bottom wing chord was 8". The nose moment was short—8" from the leading edge of the top wing. The trailing edges were even. Tail moment was 16" from the flap hinge to the elevator hinge. He used 3/4 span flaps, 1¼" chord, on the bottom wing only, with 45 degrees flap, 45 degrees elevator movement.

The biplane flew just great. In fact, it flew better than Will's Ruffy that he was using to learn maneuvers. The first time he tried a loop, Will was shocked. Though simple, a loop can be really beautiful and this one was. Next, he tried inverted flight—stable was the word! Before the first afternoon was over he had progressed through all of the pattern's round maneuvers including the cloverleaf, which he had never even tried before. Square turns were the amazing thing. They were *square*, but with noticeable tail wagging.

Will feels that drag is *no* factor at all on a medium-sized ship using plenty of power. The two successful 59ers are slow but turn tight, and on 70-ft. lines, he has been on his back and done overhead eights. Tension—a batch!

He is now building the fourth version with No. 2 being a 35-powered flop. No. 3 belongs to a buddy and has many changes toward refinement but he's gone to RC and Will hasn't really been able to evaluate it. The original 59er was intended only for Sport and Will wasn't particularly weight conscious. It had 766 sq. in. and weighed 64 oz. Lift is one thing the bipe has going for it.

Are biplanes really feasible? Let's look at these readers' comments. First, Jean's near-scale Ag-Cat reflects his engineering background and with its thin, high-aspect ratio wings with narrow chord flaps on both wings, it seems, by far, the most sophisticated aerodynamic approach to biplane stunt. Jean considered lift, drag, biplane interference, reasons for thin airfoils and even experimented with a smaller profile version of his Ag-Cat before he built the one shown. I think that the "stall" Jean mentioned probably refers to lack of acceleration after a corner rather than loss of lift. Also, from Jean's answers and a comment from Will's letter, perhaps a slightly thinner 12-15% wing with Jean's full-span flaps might also give adequate lift and slightly better overall performance.

Jack's Beechcraft reflects his competition background and was an excellent choice for a stunter. Not only is the Beech a very attractive semi-scale, but by selecting it Jack avoided major drag problems. The Beech, with its cowled engine, fuselage mounted wings, flapless configuration, flowing lines and general absence of struts and rigging is certainly the aerodynamically cleanest airplane among the three presented here.

Since the Beech is slightly larger than the Ag-Cat, its lower drag probably accounts for its somewhat better apparent performance and Jack's more optimistic attitude toward biplane competition. Avoid using rigging and struts as much as possible. Keep the airplane as clean as you can. (This isn't to suggest that the dummy radial engine cylinders should be omitted from an Ag-Cat, but flying and landing wires—never!)

Finally, the 59er was built by a relative novice just learning the pattern. Will's is quite probably the nearest thing to a competition Stunt ship presented here. Although the 59er has the same span as the 35-powered Ag-Cat, Will used a 59, which suggests that adequate power will compensate for the excess drag of biplane stunters. Will also accidentally wound up with very thin wings and chose to use flaps on one wing only, both of which tend to reduce drag somewhat. This drag reduction helps to offset the drag of his exposed cylinder head, struts, open cockpit, etc.

It's not unusual that both Jean and Jack selected 35s. Both of those airplanes were built more than eight years ago when the Fox 35 was *the* stunt engine and the airplanes both seemed physically small enough to fly well with a 35. It's been just recently that the effects of CL stunt ship drag have been more fully appreciated along with the understanding that power compensates.

I'm nagged by the feeling that this biplane discussion has been, to my mind, incomplete. Two of the fellows mentioned that their biplanes wobbled in square corners. Jack's low-powered ship wobbled slightly. Will's high-powered ship had a noticeable tail wag.

Consider this—most wobble is propeller-induced and dampened out by fuselage/tail side area. Since it appears that successful bipes will have large engines and props, propeller effects, as experienced by Will, are exaggerated. At the same time, the compact biplane configuration tends to reduce the length of the fuselage and size of the vertical tail surfaces so that natural yaw dampening is reduced.

With apologies to Jean, Jack and Will, I think that a successful bipe will probably need artificially improved dampening of propeller-induced yaw. In other words, a movable rudder. Perhaps an externally mounted elevator horn (Mustunt style) might improve a bipe's chance for success by offering both artificial dampening and an unusual amount of trimming versatility.

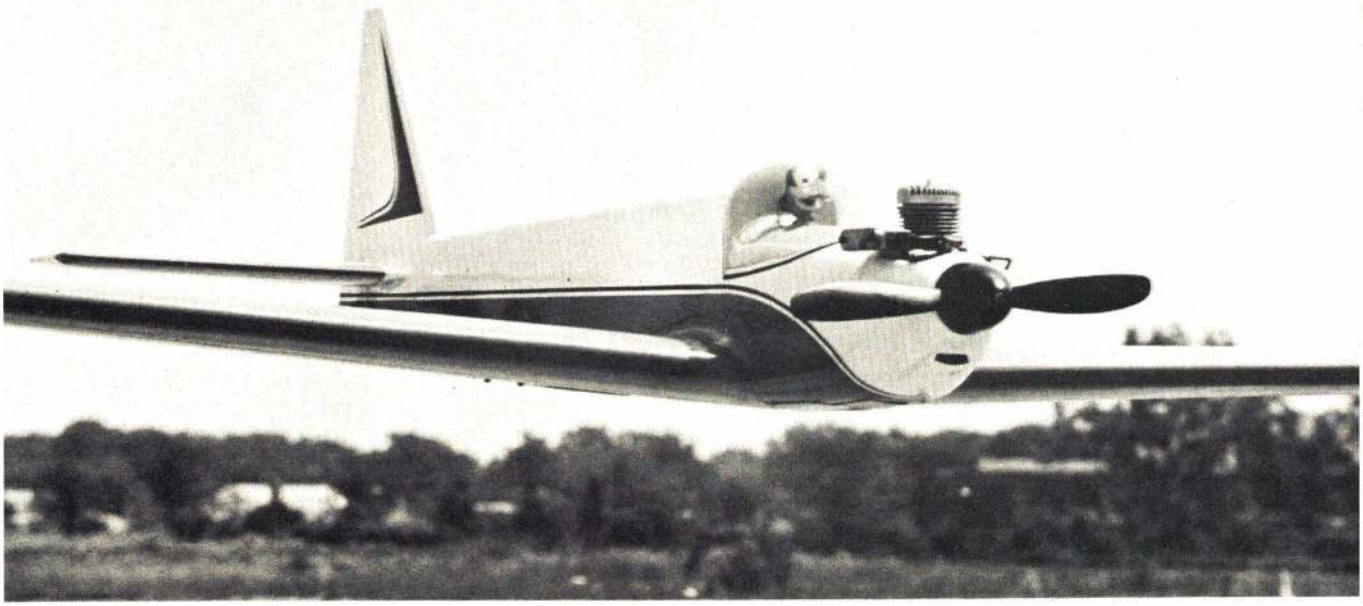
If you want to give bipes a try, here are three good airplanes (call it four, including Jean's profile). Each of these airplanes represents a good deal of developmental work by their designers and their efforts certainly deserve appreciation.

We still don't know if a bipe can be competitive. At least we can say it's a possibility. Risky? Yes, but it just might work.

By far the largest model, Wilbur Hinton's "59er" which spans 59 in. and is powered by a Fox—you guessed it—59.

High drag of the 59er is more than compensated for by the big engine, but note the small lower wing only flaps.

PRAIRIE DUSTER



Photos by Ed Sweeney

Wheels up, Prairie Duster poses for the camera. It is a very "clean" airplane except for the engine cylinder which is out in the open and upright for easy operation.

What considerations must one make when designing a new airplane? Probably most important is that it be able to carry the equipment necessary to operate it. This is not as much of a problem in these days of miniature radios as it was five years ago. Nowadays the main consideration is which engine to use. Prairie Duster was designed around the old Supertigre 60, probably the oldest of all of the 60s now available. It has been changed many times over the past twelve years and now even sports a new name, "Saturn 60." But it is basically the same engine as the 56 introduced in 1960.

Why not use a more modern engine? Well, the old ST is light, runs smoothly and reliably, and, although it may not have as much power as some of the newer 60s, it doesn't gulp fuel at a fantastic rate. And the price is right.

Having decided on the engine, we determined that the ship should weigh in at about 6½ lb. A plywood fuselage had been tried before and we chose that method of construction for the new ship because of ease in building, strength and lightness. Balsa frame construction was selected for the wing because we wanted built-in ailerons. The method shown on the plans for making the tail was used because it results in a rigid surface with pleasing contours and is simple to build.

We each needed a new ship and we each wanted a spare, so we cut out parts for four airplanes and built jigs for construction before opening the glue bottle. Assembly started in September and continued leisurely through the winter. We were slowed for a time because the landing gears were not available and it is impossible to complete the wing or fuselage without knowing how they fit. The four ships were completed in March, identical except for color schemes. Test flights proceeded routinely—the ships literally flew off the drawing board. Mark hit the contest trail and I tagged along. Now we are looking for places to put the trophies. Though Mark is still looking for a first place, he is very proud of his second place win in Class B at the NATS. He has since been moved into Class C, but continues to place.

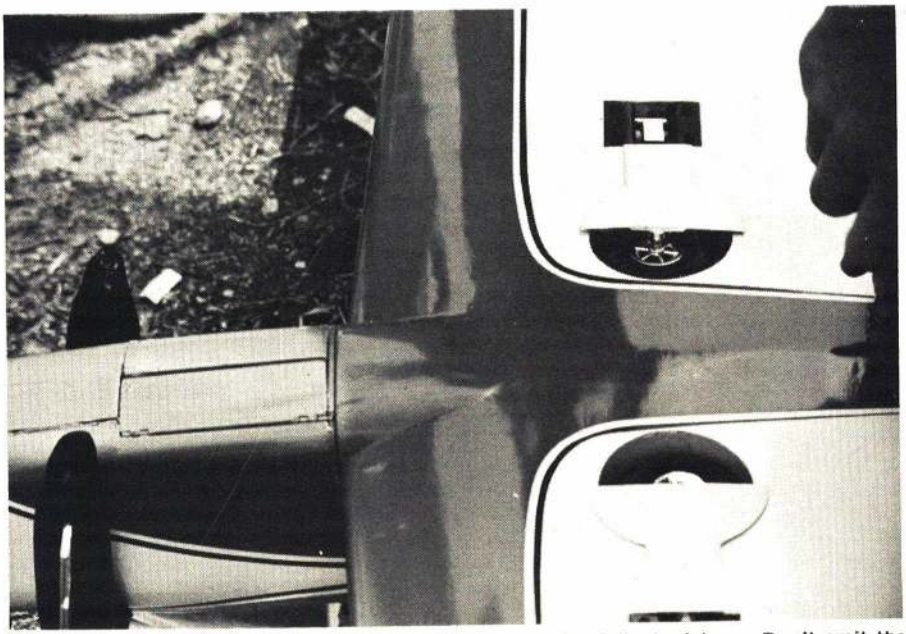
Our faith in the old Supertigre was proven when we started experimenting with fuel. This probably would not have occurred had we not been asked to test prototypes of the new Du-Bro muffler. We were concerned that some fuels would dirty it up, but Frank Garcher assured us that "Racing X" by Midwest was extra clean burning. So we switched to Racing X and then learned of the additive available to increase nitro content. We now add two cans of the Racing X additive to each gallon of fuel and that little ST 60 is hauling our ships around like one of those expensive engines.

If you are now ready to start construction, don't! Read on through the instructions and make plans on how to go about it. You can't finish the wing if the fuselage is not nearly complete, and you can't put the tail on until the wing is complete, and you can't finish the fuselage if the wing is not nearly completed, and so on. So read on before beginning construction. A few days spent in cutting parts ahead of time will reap benefits during construction.

Construction

When building four wings there can

Six-and-a-half-pound, fully equipped,
pattern plane designed for inexpensive and lightweight 60s
is attractive and competitive. / by Mark and Weldon Smith



This is the first serious contest-going plane to be seen with full wheel doors. Don't omit the doors, gaping holes where wheels retract cause lots of drag.

be no doubt about the value of assembly in a jig. Time spent in making the jig is short compared to the time required to assemble several wings. We would suggest, however, that the jig be used even though you only plan one wing in it. It eases construction and assures a true wing. Make it from two pieces of plywood or chipboard hinged at the center. Lay out the wing planform on these with strips of pine as shown in the jig cross-section. Place the complete jig on your workbench and raise each tip 1¼ in. Check each panel of the jig for flatness by placing a yardstick across the center and another across each end in turn, and, sighting across the yardsticks, adjust the blocking under the ends to make them parallel. Lock it all down and you are ready to build.

Prepare the four spars by gluing the doublers to them before installing in wing. Pre-assemble the 1/8" square keys to the back side of the leading edges. Be sure to get them on straight. We cut a small slot (using a table saw) in the 1/2 x 1" leading edges and glued the 1/8" square in the slot. This assures that they are centered and straight. Make a line along the center of the front side of the leading edges to use as a guide for shaping later. Pin the leading edges into the jig, beveling the centers for a good joint. Join them at the center with a piece of 1/16" plywood, clamping until glue sets.

Prepare the two bottom trailing edge sheets from 3/32 x 4" balsa, using the tapered scrap to increase the width as required near the center section. Note that the aileron cutout should be made before placing in jig. Since the two top trailing edge sheets are the same size, make them at this time also and set aside for future use. Pin two of the sheets in place on the jig and cut the center joint for a good fit, gluing it together. Now lay R-2, R-6, and R-10 in place. Insert the aileron torque rods through the bearings and check that everything lines up properly. If not, you may have forgotten to shim R-10 temporarily with 3/32" scrap. When all is aligned, glue these ribs in place, using a square to get them 90 degrees to the jig base.

While glue is setting, glue in the full-depth spar between R-6 and R-10 and to the bottom trailing edge sheet. This spar should be hollowed slightly on the rear side for clearance from the aileron. Double the bottom TE sheeting in the center section between ribs R-2 with 1/8" plywood. This will later serve as a bearing for the wing attachment screw. We soaked the plywood in water for an hour or so, then bent it to the proper angle in a simple wood and screw press several days before wing assembly was started.

If you read this all through before starting you won't be delayed now. Fill in above this plywood with balsa cut at a 15 degree angle. Now remove the aileron torque rod and glue in the remaining ribs. Replace the torque rod, pressing the thrust bearing in place. Fill in between R-2 and R-3 at the TE using more of that balsa cut at a 15 degree angle. Install the top spars, getting a good butt joint at the center. Now put on the top TE sheet, using "backward" clothespins to clamp it at the TE. (Take ordinary spring clothespins apart and place the flat sides together, replace the spring between them in the opposite direction to which it was originally, and pinch together the "wrong" end; the original "pinch end" becomes the clamping end.) Fit and glue in the four full-depth false spars between R-1 and the two R-2s. Now plank the leading edge from the LE spar back over the main spar, add the rest of the top planking, and add the cap strips over R-5 through R-10.

The wing is now ready to remove from the jig. Right? Wrong! You have yet to frame the ailerons. If you still haven't figured out how to make them while you're building the wing, do it now before removing the wing from the jig. Roughen up the aileron torque rod with sandpaper for better glue adhesion. Lay a strip of 3/32 x 1/2" balsa along the TE jig and pin down in position. Glue aileron ribs between the torque rod and this TE strip using epoxy. It is wise to have the aileron horn studs in place and parallel to each other at the inner ends of the torque rods before gluing ribs in place. Space the inner and outer ribs of the ailerons 1/32" from their fixed counterparts in the wing structure.

Next, glue a narrow strip of 3/32" balsa in front of the aileron ribs, beveled to meet the aileron torque rod. This strip must be tapered to match the taper in thickness of the wing. It is easier to install and taper it before the top TE sheet is put on the wing. If you have read this far before building, you will remember to build the ailerons right along with the wing. To taper it to conform to the wing, use a long sanding block with R-6 and R-10 as guides. Now glue the 3/32 x 1/2" aileron LE on top of the ribs and add cap strips to complete the top of the aileron.

If you managed to get yourself into a bind by not reading this all the way through and you have the wing top completed without ailerons, don't despair (we didn't). Glue the front strip of the aileron down against the torque rod and against the front of the ribs making it high enough so that it projects above the top sheeting. Then add the 3/32 x 1/2" aileron LE behind this strip and sand the projection down flush. We did ours both ways and either way worked out well. Leave about 3/32" to 1/8" gap at the inner end between the aileron and the wing and you will have plenty of throw clearance.

At this point you have completed most of the wing structure and should check that the following items are installed: (1) LEs; (2) all ribs; (3) top spars; (4) top and bottom TEs on wing and ailerons; (5) top LE sheeting; (6) center section planks and cap strips. If all this good stuff is there and the glue is dry, remove from the jig.

Now reverse the jig, letting the tips touch the table and raising the center only one inch because of the taper in thickness. Place the wing back in the jig

and get the landing gear installation worked out. We used 1/32" plywood to form the wheel wells. We wrapped it around a beer can and joined the ends with a scarf joint, then fitted and sanded until it was ready to glue in place. The Rom-Air gear pressure lines were easily installed in the wing while the bottom was still open. Some other landing gears may be more easily installed from the top. If this is the case, reverse the "top" and "bottom" of these instructions and start the wing upside down.

After the gear installation is worked out, add the bottom spars, the 1/4" spar joiner, and the spar webs. If you forgot the false spars in the leading edge center section, put them in before adding the LE sheeting. They do strengthen the dowels to be added later. Add center sheeting and cap strips, and wing structure is almost complete. Shape leading edge and radius trailing edge after removing from jig.

All that remains before covering the wing is to add the tip blocks and sand to shape. Before doing this, however, consider the "Vortex Degenerators." Leave them off if you will, but we will not guarantee adequate aileron control without them. In addition to improving aileron effectiveness, they have another benefit which we considered when designing, and which was proven at a contest in Minneapolis. Mark suffered the embarrassment of having a main gear leg fall out on landing. The ship skidded to a stop in a gentle turn on the left main gear, the nose gear, and the right wing tip. This was on asphalt, and the only damage was a slight scraping of the "Vortex Degenerator." No other damage to the ship!

We glued the tips on leaving a 1/8" slot along R-10 from the spar aft. The tips were shaped, the wing sanded, and then covered and prepared for paint. Before the final coats of dope were applied, the silk was removed from the slot and the 1/8" plywood tip skids were slid into place and glued. The slots in the tip plates are there to clear the nylon bearing for the aileron torque rod; we installed them after covering to make the procedure easier.

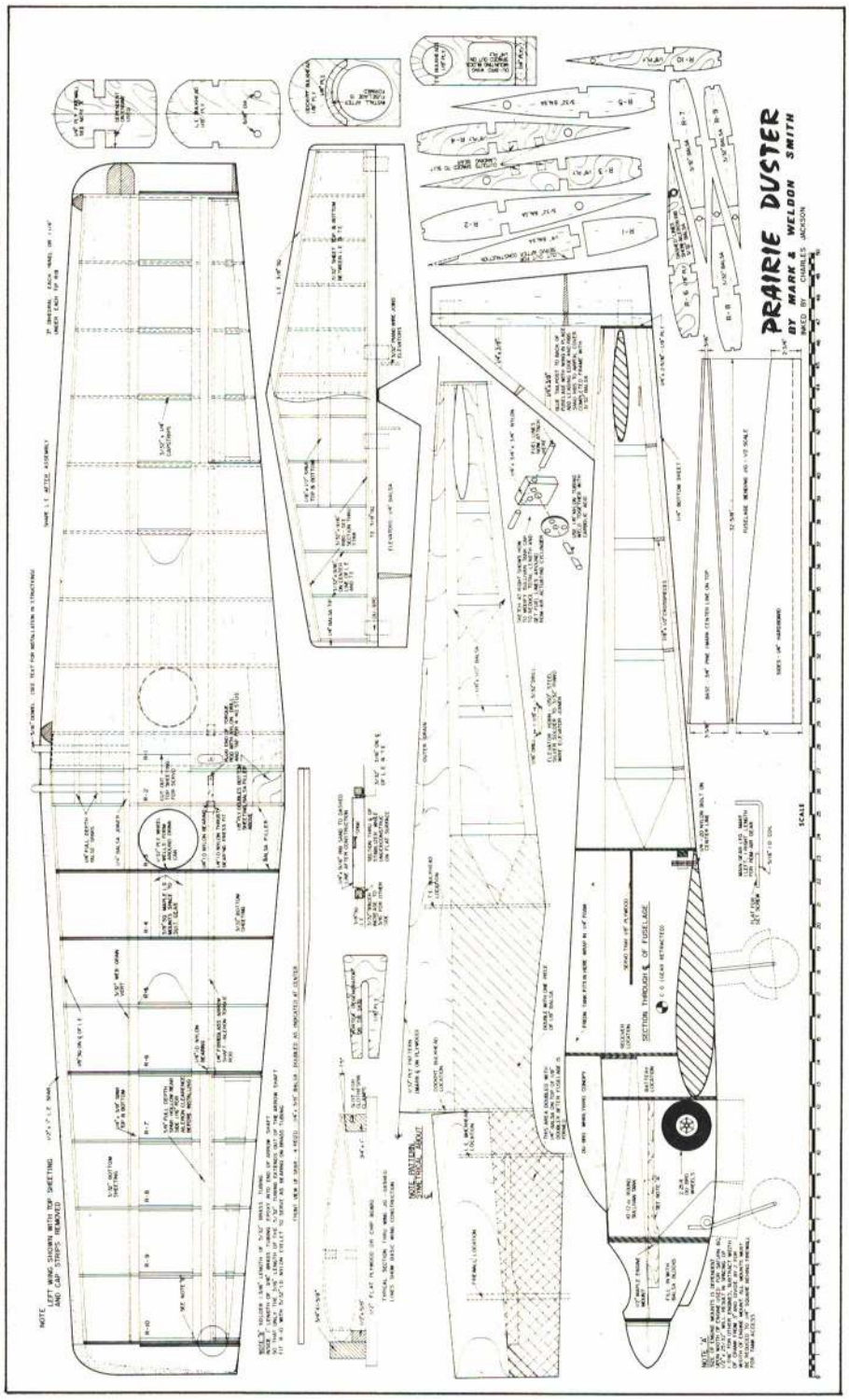
Begin the fuselage by cutting its shell out of a sheet of 1/32" birch plywood, 18 x 48". Next double from the nose back to behind the wing with 1/8" balsa as indicated on the pattern. Finish the 1/8" balsa doubling of the aft fuselage with 1/8 x 1/2" balsa strips. Use slow-curing epoxy for all this and weight down for a good bond. While the epoxy cures, prepare the engine mounts and bulkheads. (See Note "A" in regard to the engine mounts.) The forward portion of the fuselage will be 3" wide inside the 1/8" doublers after the bend is made, so you want the engine mounts to be the width which will result in proper space for your engine after forming the fuselage. Epoxy the mounts to the 1/8" doubler.

While they cure, you may want to make a simple jig in which to bend the plywood. We made four planes at once so that we would each have one and a spare, and the jig was well worth the short time involved in making it. However, the fuselage can be formed using tape, rubber bands and "C" clamps. With the jig completed and all epoxy on the shell cured, bend plywood in your hands with doublers inside and push down into jig. Align centerline of ply with centerline of jig. Now push cockpit and trailing edge bulkheads and the 1/4 x 2-5/16" tailpost into place. At this point you will agree that this is the best way to make a fuselage, so take out the bulkheads and replace them, using epoxy to make everything permanent. With the jig, you can use a five-minute epoxy to speed it up. Note that the fuselage begins to taper at the cockpit bulkhead, and at this point of construction the nose portion is still flared outward ahead of the jig. Leave it like this until the epoxy cures.

Next install the leading edge bulkhead and the firewall, sliding them over the engine mounts and pulling the nose together with "C" clamps. (Let's hope that you made provisions for mounting the nose gear behind the firewall before gluing it in.)

When these bulkheads are set you will have a nicely tapered rear fuselage shell and a big ugly blob out in front with two thin plywood tabs sticking up on each side. Don't despair! It will soon look beautiful. Gingerly, so as not to

FULL-SIZE PLANS AVAILABLE—SEE PAGE 84



They fly to win.

There are six winners on this page.

Count 'em. On the left is racing champ Howie Keefe and his famous plane "Miss America," long-time favorites at National Championship Air Races. That's two.

On the right, meet Art Scholl, member of the world champion U. S. Aerobatic Team, and *his* winner, the Pitts Special. That's four.

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split the plywood, cut down along the front of the cockpit bulkhead just far enough so that the plywood will curve over the firewall and LE bulkheads tightly. Now install the 1/8" plywood ring segment on the front of the cockpit bulkhead. Trim each side of the 1/32" plywood for a neat butt joint at the center and cut off that portion which extends forward of the firewall down to the 1/8" doubler, then glue down using a straight piece of hardwood to clamp down on the center joint. Use a 6" length of cloth 1" wide to reinforce the inside of the joint. This completes the bending process. There are no compound curves in the plywood, and, consequently, no "swaybacked" appearance which results from attempts to bend plywood in more than one direction.

You still have that unsightly blob sticking out in front, however. Let's work on that now. Set your engine in place on the mounts and locate it so that you have the propeller drive in the right place, then mount the engine. Fill in the area below and around the engine with balsa until you have a big "U" shaped balsa block sticking out ahead of the firewall. (The inside of the "U" must taper forward of the engine mounts to conform to the top view of the engine.) Face off the front of this to accept a 1/8" plywood ring and with the engine firmly in place, glue the ring on.

Now you are almost ready to shape the nose. Note that the balsa added in front of the firewall has braced it considerably. But the backside of the firewall is still just a butt joint against the balsa doubler. Take care of that now by fitting a piece of 1/4" balsa sheet on each side from the firewall back to the leading edge bulkhead and from the engine mounts down to 1/2" below the existing sides. Now sand the nose to shape, using the nose ring and the bulkheads as guides. All that remains now to complete the fuselage is to glue on the 1/4" sheet bottom aft of the TE bulkhead and sand the edges round.

There still remains a 2½ x 6" hole in the bottom of the nose which can be treated as you wish. Fill it in with 1/2" balsa leaving a hole and slot for the nose gear to retract into, or, better still, fit doors which close the nose completely with gear retraction. The latter choice is the one we made for two reasons: (1) Tank is accessible; (2) They sure look nice when they snap closed. The doors are not detailed on the plan, but are relatively simple to make, though time consuming.

The two rear doors are 3-5/8" long and are hinged on the inside of the 1/4" balsa doubler which locks in the firewall. Start with a piece of 1/32" plywood for each which is wide enough so that both doors and the pin portion of the hinge fit inside the fuselage sides. Remove the pins from the Du-Bro hinges and glue the leaves in place at the corners of the plywood with a piece of 1/32" piano wire through the hinges to align them. A piece of 1/16" nylon tube is fitted between the hinges (on the wire) and glued to the plywood at the same time. Cut a piece of 1/32" balsa to

Mark Smith at the 1972 Nationals where he placed second in Class B. He's now competing in Class C with the same model and same engine.

the same size as the door and cut the corners away where the hinge leaves are located, then glue this to the plywood. Now glue another piece of balsa 3/16" thick on top of the 1/32" balsa. You now have a door 1/4" thick with hinge leaves sandwiched between the plywood and the balsa. Glue a piece of 1/16 x 1/8" hardwood across the front of the LE bulkhead 3/16" above the bottom to act as a doorstop. Now install the mating hinge leaves to the door with a 1/32" piano wire hinge pin and glue the loose hinge leaves to the inside of the fuselage sides with the door held in place against the stop. Remove the pin and drill a hole through the LE bulkhead. You will need this hole to install and remove the hinge pin later. Make a slight saw cut on the back side of the LE bulkhead in line with the hinge pin hole to recess the bent end of the hinge pin.

If you were making both doors at the same time, you can now install them in place to survey what has to be done with the 2½ x 2½" hole that is left ahead of them. We moved the hinge line of the front door inboard by gluing a triangular piece of 1/4" inside the nose from the firewall back to the back of the front door. Since there was another piece of equal size when we cut this one, and since it looked as if it would strengthen the firewall, we glued it to the other side (we hate to throw anything away!). We now had a width of 2" left on back of the firewall which was just right for installation of the Rom-Air nose gear. Next, we filled in part of the hole left in front of the rear doors by gluing a piece of 1/4 x 3/4" balsa inside that last piece we didn't want to waste. We now had reduced the opening to 1¼ x 2½" offset to the side to which the nose gear strut was coiled. Another door was made after door stops were installed as needed and all three rough doors were installed and sanded to conform to the fuselage contour.

We now had the doors but no way to activate them. Linkages to the nose gear strut would work but seemed to be too complicated for practicality and reliability. Simple things are usually best and when we were discussing the advisability of making the doors, Mark came up with the idea we decided to try which worked beautifully.

A Du-Bro hinge leaf was glued on the inside of each rear door so that the pin line began 3/4" aft of the front of the door and was 1/2" from the door hinge line, and parallel to the door hinge line. These were connected with a 2½" coil of .020" piano wire formed around a length of 3/32" piano wire held in a variable speed hand drill. The front door was fitted with a piece of 1/16" plywood glued to its inner surface and projecting back 1/2" under the rear door on that side. A hole was drilled through the rear door and the 1/16" plywood while the doors were closed, and a piece of 50-lb. test monofilament was knotted and threaded through both holes then knotted again so that when the rear door opened it would pull the front door open. In operation the strut retracts against the coil spring, and stretching the spring closes the rear doors. One rear door in closing contacts the plywood projecting aft from the front door and closes it. On extension, the tire starts the rear doors open, the spring straightens and holds them in position, and the monofilament meanwhile has pulled the front door open.

We had spent considerable time making the doors and were a bit apprehensive about using them, being fearful they might disappear into debris in one bad landing, or even be torn off by the grass on the field where we fly. So, needless to say, we flew our test flights without the doors, and didn't use them until the first contest on a hard surface. They worked without a flaw and we have learned that our fears were groundless and have left them on the rest of the season on all types of surfaces without damage. Mark even had two unscheduled nose gear retractions at the Milwaukee Pre-Nats warmup without damage. These, incidentally, were caused by mis-rigging of the monofilament which kept the front door from opening far enough, which in turn caused the strut to hang up on the front door and fail to lock. One last word on the doors: We are reasonably certain that they require a source of power separate from the receiver. Use a gas-operated gear or electric unit with servo power from a source other than receiver battery.

In joining the wing and fuselage, lay the completely sanded wing into the fuselage and check for proper fit. If wing does not fit between LE and TE bulkheads, remove wood from trailing edge until it does. Check fit of wing into fuselage opening and sand fuse until a good fit is attained. Align wing axis at 90 degrees to fuselage axis by measuring from tailpost to wingtip and adjusting until measurements are equal. Be sure wing is centered on fuse. Mark location of dowel holes by reaching through nose gear well. Drill 5/16" dowel holes parallel to chord line through LE false spars, and spar joiner. Install dowels, gluing well.

Drill and tap the nylon wing hold-down block 1/4-20 if you have not already done so, and screw a 1/4-20 stud with a point on it into the block so that the point projects slightly beyond a line across the fuselage sides. Plug wing dowels into their holes in the LE bulkhead and drop TE of wing down to mark the center of the screw hole. Be sure wing is aligned 90 degrees to fuse-

(Continued on page 98)

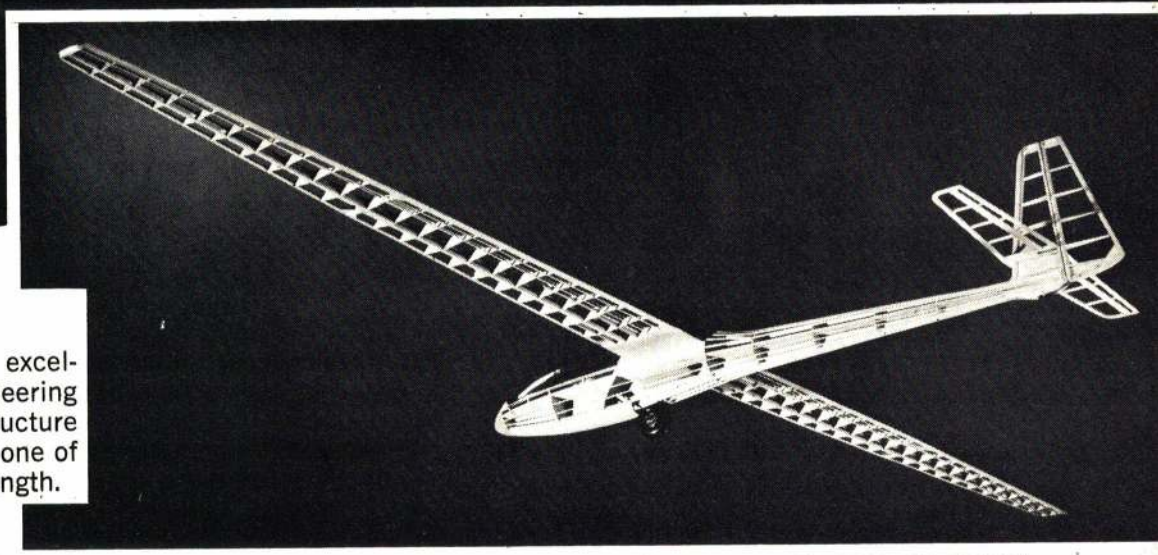
beautiful

Cirrus

SPAN: 87 5/16″
LENGTH: 37 3/4″
WEIGHT: 12 oz.
SCALE: 1.5″ Equals 12.0″

KIT E7
10.95

over seven feet of sheer grace and beauty . . .



STRUCTURE

Frame Photo reveals the excellence of the design engineering of the kit. Although structure is relatively simple, it is one of fine detail and great strength.

A FINE KIT

Top quality Balsa used throughout. All parts accurately die cut and numbered to insure fast accurate assembly, as shown on the detailed plan. Also included are shaped trailing edges, finished nose cone, giant clear canopy, authentic decals, full size plans with step-by-step drawings and instructions, etc.

GREAT FLIGHT PERFORMANCE

A real soaring machine is this model Cirrus. Eiffel 400 soaring wing section seeks out and takes full advantage of every thermal current. Can be flown Tow Line - Free Flight, Single Channel or pulse R/C for Slope and Thermal Soaring. Large Cockpit area provides ample room for R/C Equipment.

STERLING MODELS ● BELFIELD AVE. and WISTER ST. ● PHILA., PA. 19144
If no dealer available, direct orders accepted—with 10% additional charge for handling and shipping. (60c minimum in U.S., $1.25 minimum outside U.S.)

- ☐ Catalog of entire line of airplane control line model kits, R/C scale and Trainer kits, boat model kits, accessories; etc. 25c enclosed.
- ☐ "Secrets of Model Airplane Building." Including design, construction, covering, finishing, flying, adjusting, control systems, etc. 25c enclosed.
- ☐ "Secrets of Control Line and Carrier Flying." Including preflight, soloing, stunting, Carrier rules and regulations, Carrier flying hints and control line installation instructions. 25c enclosed.

No checks. Only U.S. money orders or currency accepted.

Name _____

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THE HOBBY INDUSTRY OF AMERICA PROMOTES ACHIEVEMENT

AVAILABLE IN CANADA

Sterling MODELS INC.
PHILA., PA. 19144, USA

You don't have to STAND OFF to admire this

CITABRIA

KIT FS31
29.95

Span 54" Area 415 sq. in. Length 36" For Engines .23 to .35 Scale: 1.61" Equals 12.0"

SPECIAL THANKS

The beautiful Citabria is manufactured by one of the oldest and respected names in American Aviation, The Bellanca Corporation, who so graciously provided us with the plans, photos and details of the full size aircraft. With this illustrious lineage, it is not surprising that the Citabria is just about unbeatable as a fun plane. Primary trainer, or for Aerobatics.

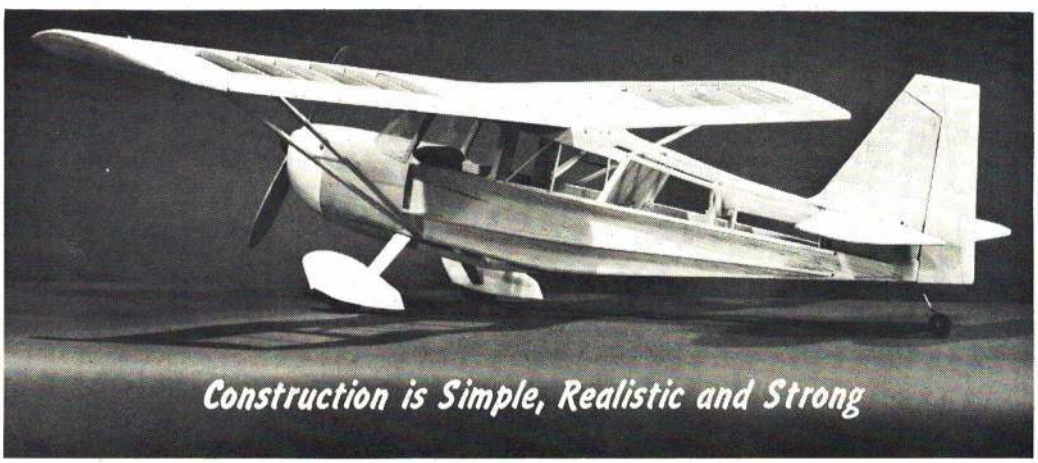
CITABRIA IS FOR YOU

If you're a Sport Flier, if you have a feeling for Scale, if you love R/C*, then this is your ship. It's a beautiful machine that builds easy — goes together fast — plenty of room for any equipment — rugged for hard use — flies great — and is just about the right size.

* Can be flown Control Line too—instructions on plan.

ABOUT THE KIT ITSELF

This kit is a real joy . . . Balsa Wood is the finest grade, density-selected and sanded to micrometer tolerance; as is the imported Finland Birch Plywood. Every part is numbered to insure fast and accurate assembly as shown on the easy step-by-step plans.



WING AND TAIL SURFACES

Complete wing is built on work bench without having to remove it — so it's flat and warp-free. Parts are die cut and carved. Balsa sheet cover makes for tough wing. Wing is installed like it ought to be — with dowel pins and nylon screw in wood nut-block. No unsightly rubber bands to deteriorate, break or slip. Rudder and Stab are die cut sheet for simplicity and no warp. Included is all the linkage hardware: pushrods, aileron and elevator horns, bellcranks, clevis, connectors, etc., plus giant authentic decals, plastic windows, etc., etc.

THE FUSELAGE

Fuselage sides are die cut full length. Cabin sides and inner doublers are plywood as are the firewall and landing gear bulkheads. It's easily assembled with die cut balsa bulkheads, nose block, formed music wire landing gear, custom dural engine mounts, etc. Cowling and wheel pants are rugged plastic.

AVAILABLE IN CANADA

STERLING MODELS • BELFIELD AVE. and WISTER ST. • PHILA., PA. 19144

If no dealer available, direct orders accepted—with 10% additional charge for handling and shipping. (60c minimum in U.S., $1.25 minimum outside U.S.)

- ☐ Catalog of entire line of airplane control line model kits, R/C scale and Trainer kits, boat model kits, accessories; etc. 25c enclosed.
- ☐ "Secrets of Model Airplane Building." Including design, construction, covering, finishing, flying, adjusting, control systems, etc. 25c enclosed.
- ☐ "Secrets of Control Line and Carrier Flying." Including preflight, soloing, stunting, Carrier rules and regulations, Carrier flying hints and control line installation instructions. 25c enclosed.

No checks. Only U.S. money orders or currency accepted.

Name _____

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THE HOBBY INDUSTRY OF AMERICA PROMOTES ACHIEVEMENT

Sterling MODELS INC.
PHILA., PA. 19144, USA

The Great Age of Sail . . . Lives Again in these Authentic Scale Model Kits

THEY'RE EASY TO BUILD

We know it seems unbelievable, but it's true. New techniques in the heretofore difficult rigging installation and ratline making, are simplified so that almost anyone can produce a craftsman-like job. Density selected prime balsa wood is a real pleasure to work with, and the step-by-step plan is simple and complete.

Sterling MODELS INC.
PHILA., PA. 19144, USA

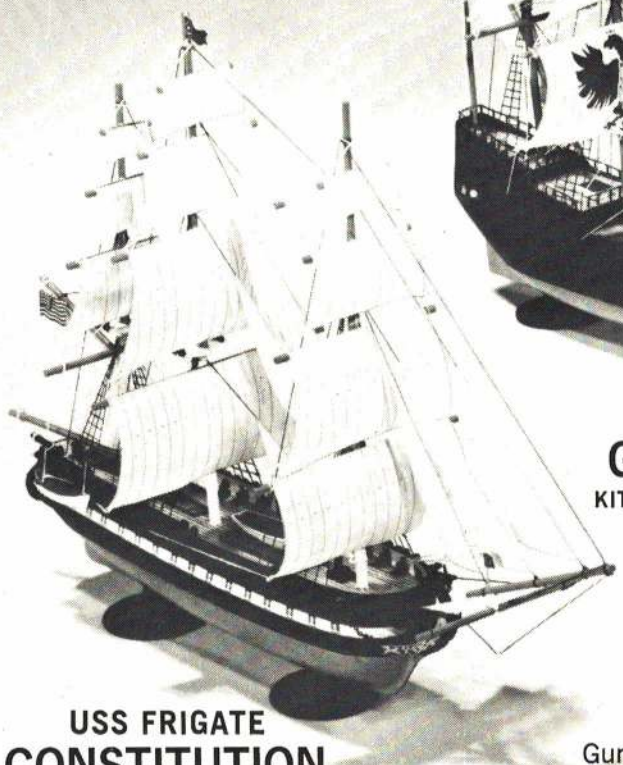
THEY'RE COMPLETE*

With machine carved hulls, that require only a little trimming and sanding. Kits include many finely detailed cast metal fittings (as required for each kit) such as: Cannon, Life Boats, Windlass, Anchors, Steering Wheel - Wheel House, Water Cask, Lights, Stern Castles, Figure head, etc. Brass Chain, Black and Tan rigging line, Printed Cloth Sails, Decals, Display Pedestals and much more . . .

* Dry Kit, paint and cement not included.

SCHOONER
BLUE NOSE
KIT G3 — Length 11¼"

SPANISH
GALLEON
KIT G1 — Length 10"



USS FRIGATE
CONSTITUTION
KIT G2 — Length 11"

THEY'RE UNIQUE

Because such amazing detail and authenticity is achieved in kits that are relatively easy to build. Plans include full size, as well as assembly drawings for each step of the way. Authentic color scheme shows on full color kit box lid.

THEY'RE HISTORIC

Plying the Spanish Main, the Galleons carried the treasures of the New World back to Spain. Outfitted with cannon they were used both as merchant men and warships . . . The Blazing Guns of the *Constitution* helped to establish our Nation. Now enshrined in Boston Harbor, it is the oldest commissioned vessel in the U.S. Navy . . . Built by Angus L. Walters the *Bluenose* was one of the finest Schooners to take the water. It came to world-wide fame racing against the *Gertrude L. Thebaud. Bluenose* captured the hearts of U.S. and Canada to such an extent, that today it is on the back of every Canadian Dime.

THEY'RE ONLY

6.95 ea.

- CARVED WOOD HULLS
- CLOTH SAILS
- CAST METAL FITTINGS

AND THEY'RE AT YOUR DEALERS NOW

GET OVER AND SEE THEM . . . BUY ALL THREE!

SCALE

BILL BOSS ON CL

Torque Tube Control: Use of the torque tube principal for operating motor control and flaps in multi-engine models provides a smooth operating system, eliminating the need for the usual maze of bellcranks. The accompanying sketch outlines an installation in a two-engine model in which an upside down mount Roberts unit is used upright to achieve the movement shown by the directional arrows.

The system is made of materials readily available in most model shops: 1/8" OD and 1/8" ID *hard* brass tubing which comes in 12" lengths, right angle nylon bellcranks such as the Goldberg Aileron Bellcrank, and a few straight pins.

In this particular installation, the sketch shows the torque tube passing through the center of motor mounts that are the full length of the engine nacelles and wing width. If your model is not constructed in this manner, perhaps a rear wing spar, or other structural member can be used for mounting the torque tube.

To accomplish the installation shown, start by clamping all four motor mounts together and drill a hole (at appropriate location) that will accept the 1/8" ID tubing with a force fit. This tubing when inserted in the motor mount will act as a bearing for the torque tube. Next, cut off one arm of the nylon bellcranks, and enlarge the mounting holes so that they can be passed over the 1/8" OD tubing.

Cut pieces of 1/8" ID tubing (at least the width of the motor mounts) that are to be torque tube bearings, and press them into the motor mounts. Install motor mounts in place being sure to keep all holes lined up so that the torque tube will freely pass through them. When ready, the 1/8" OD tubing is passed through the motor mounts, and at the same time nylon bellcranks are put in place. If 12" lengths of tubing are not long enough, use additional lengths splicing them together with a short length of the 1/8" ID tubing. Solder splices.

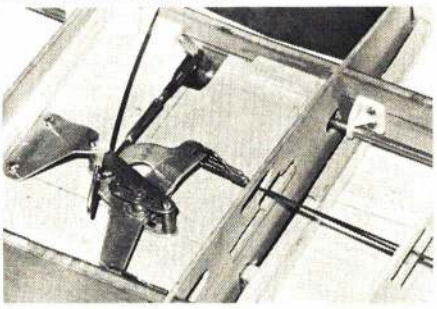
When you have determined that the nylon bellcranks are in the correct position for flap and motor control operation, drill a hole (No. 60 or smaller) through the bellcrank and tubing. Insert straight pin in hole, bend pointed end over much like you would a cotter pin; cut off excess. The bellcrank is now locked in place and ready to be linked to flaps and motors.

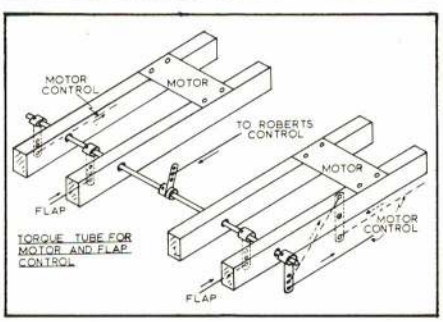
The use of motor control and flap linkage such as the Du-Bro Kwik-Link control rod assemblies will permit the final adjustments the system may require.

If the motors you are using require a control movement opposite that shown by the directional arrows in the sketch, an intermediate bellcrank, 1:1 ratio, can be installed as shown by the dotted lines.

While the sketch and details outline an installation for a specific two-engine model, there is no reason why this same principal couldn't be used, with modifications, to fit any type of multi-engine model.

Roberts three-line control system links directly to the torque tube which rides in nylon brackets also visible here.



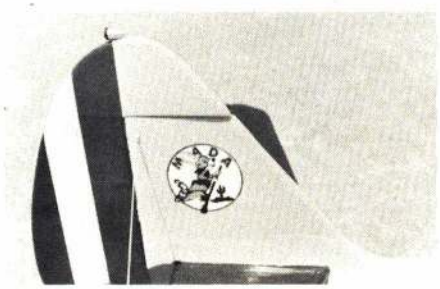


CLAUDE McCULLOUGH ON RC

Homemade Decals: Small lettering on a scale model is a final touch adding to realism if done properly, but better left off if it can't be done right. Letra-Set or similar dry rub-off transfer lettering, obtainable from drafting and office supply stores in a wide range of sizes, styles and colors, gives professional looking results. Trouble is, the amount of pressure required to separate the letters from their backing sheet usually indents and permanently damages the surface, not to mention the difficulty of working directly on the model.

Hank Pohlmann and Ron Norgard got around these problems by developing a system for making a decal using the transfer lettering. First requirement is a light box to better see the letters, particularly white, during layout. Make this from a cardboard box with a piece of glass taped over an opening and lit with a 60 to 100 watt trouble-shooting light. The warm glass aids transfer of the lettering, but cut some ventilating holes in the sides to keep the temperature at a reasonable level. Use blank decal paper with only glue applied. It must be kept absolutely free of fingerprints and oily smudges as well as wax from the back of the lettering sheet, so keep it covered with a sheet of translucent paper with just an opening for the letter being applied at the time. Tape the decal paper to the light box glass.

A fantastic job of lettering here on Pohlmann's P-51. See text for details about the method.



Dick Graham painted this decal with enamel on black paper then transfered to his Liberty Sport model as finished art.

Directions accompany the transfer lettering and line-up marks on the sheets aid in keeping the lines straight. Brush on one or two coats of Dulux Clear Enamel to seal and finish the decal. When dry, it is soaked in water and applied to the model in the usual way. Other sealers can probably be used but be sure to test them on a small sample first. The decal can be further sealed by giving the entire model a coat of clear Dulux if your paint or dope job is compatible. Again, test beforehand.

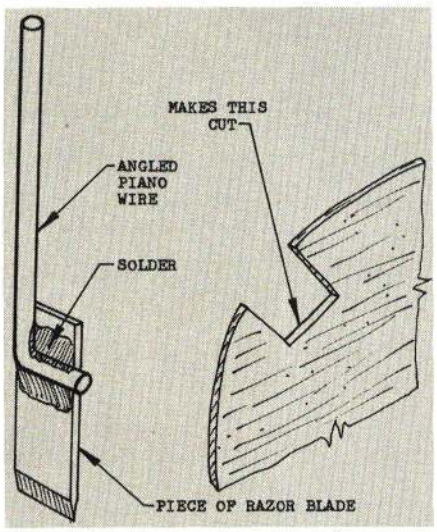
Most any kind of insignia can be painted with colored enamels on blank decal paper and overcoated with clear to produce a decal. It doesn't require high artistic ability since the design can be drawn or traced on the decal paper with pencil and painted in kid's coloring book fashion. Fine accent lines, thin stripes or small details can be done with colored drawing inks made for use on plastic and mechanical drawing tools.

The small airplane shown on the side of Pohlmann's P-51 Miss America was made by another process available at art supply stores, a liquid called Decal-it. This lifts any painted design off of paper and converts it to a decal. There is no glue on the back of this type but thinned white glue can be used to attach it to the model. Liquitex artist's acrylic paint was used for the small airplane decal.

As a service to those wishing to try this process, Sig will provide a 12½ x 18" sheet of blank glued decal paper for 95 cents plus postage and handling.

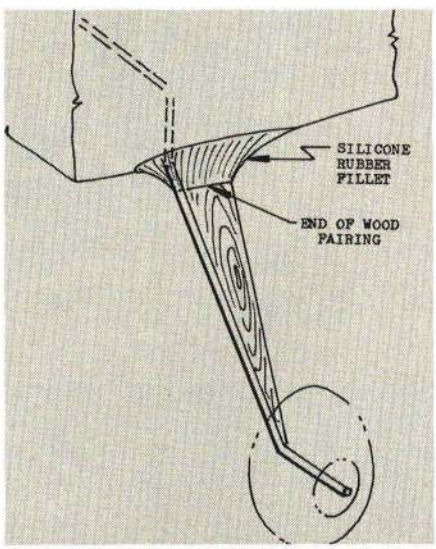
WALT MOONEY ON FF

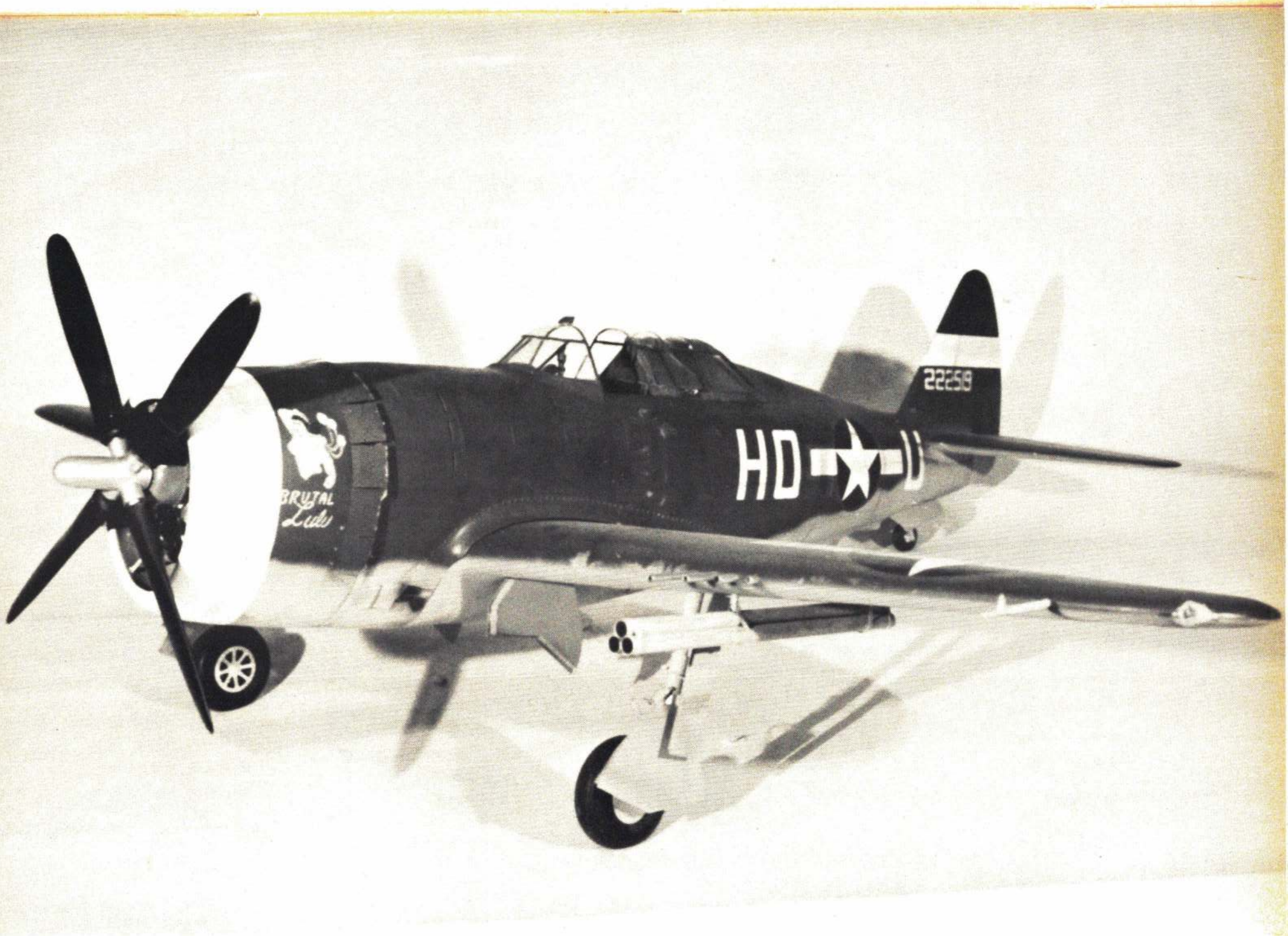
Cutting Tool: Dave Gjessing of Granville, Ohio has come up with a little gadget that is simple to make and will fill a need in almost anyone's model making box. Basically it's just a piece of music wire bent in a right angle soldered to a small piece of razor blade. The thicker single-edged blade will give a stronger tool than a double-edge blade. The wire provides you with an easy-to-hold handle. This tool is used to make the center cut in a notch in a former or a rib. You'll need one for each size of stringer you use, and you'll find they do a good job regardless of the grain direction.



Landing Gear: Ever noticed that a plain wire landing gear never breaks, but when a landing gear leg fairing is added, the landing gear either breaks or it breaks the fuselage? To solve this problem don't cement the fairing to the fuselage, but end it about 1/8" below the fuselage and fill the gap between the fairing and the fuselage with some Silicone rubber bathtub sealer.

With a Silicone fillet the wire is free to flex without putting much load into the fuselage structure.





"BRUTAL LULU" P-47D, built from a C.A.P. kit. First Place Military Scale, by Bud Nosen

TOWER

P.O. BOX 543 CHAMPAIGN,

Send self-addressed stamped envelope for current special sheet and free "Tower Power" pressure sensitive labels.

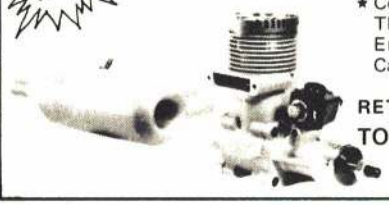
All prices in this ad and in our current catalog are subject to change without notice.

IT'S NEW

H. B. .61 R/C ENGINE

- ★ Made in West Germany
- ★ Perry Carburetor
- ★ Complete with muffler

This is the finest .61 Engine Tower Hobbies Carries.



RETAIL $100.00
TOWER PRICE $64.00

RADIO CONTROLLED HELICOPTERS

DOMESTIC MANUFACTURER MEANS READILY AVAILABLE PARTS

Du-Bro "HUGHES 300"

RETAIL $350.00
TOWER PRICE $299.00
Complete with O&R Engine

RC Helicopters Inc. Bell Jet Ranger

NEW RETAIL $400.00
TOWER PRICE $350.00

SUPER MONOKOTE

6 FOOT ROLLS

NO MINIMUM NO LIMIT!

		ONLY
OPAQUES: Red, White, Orange, Yellow, Clear, Aluminum, Gray, Blue, Dark Blue, Black, Chrome, Olive Drab	Retail $8.10	$5.00
TRANSPARENTS: Yellow, Red Orange, Blue (NEW!)	Retail $9.00	$5.60
ALL NEW FLAT FINISH: Olive Drab, Dove Gray, Aircraft Aluminum	Retail $9.00	$5.60
METALLICS: Plumb crazy, Green, Blue	Retail $10.50	$6.50

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6 FOOT ROLLS

		ONLY
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METALLICS: Green, Gold	Retail $9.00	$6.00

GRAUPNER

CUMULUS

Here is the king of sailplanes, by the king of quality; Graupner. Designed for towline and slope soaring, or power assisted thermal flying, 2 channel: rudder and elevator. Wing span 110¼", weight (ready to fly), 56 oz. Foam wings are already balsa covered and sanded, fuselage is one piece of plastic ready to paint, all other parts sanded, and ready for "film" or paint.

RETAIL $169.95 TOWER PRICE $92.50

CIRRUS

The Cirrus is a 1/6 scale model of a full size sailplane manufactured in Germany. Wing span of 118 inches, overall fuselage length of 49 inches. Fuselage is basically composed of three high impact molded plastic pieces. Wings, tail and stabilizer, are built up in the conventional manner. A high performance soarer for 2 channel R.C.

RETAIL $79.98 TOWER PRICE $39.00

KWIK FLY MK III

This is the world champion model designed by Phil Kraft for acrobatics. Wing span of 59½ inches and will take up to a .60 for 4 channel RC equipment. This model is easy to build due to its extensive prefabrication.

RETAIL $95.98 TOWER PRICE $41.00

MARK'S MODELS

WINDWARD

Span 72 Length 41 Area 532

RETAIL $25.95 TOWER PRICE $19.50

WINDFREE

Span 99 Length 41 Area 555

RETAIL $34.95 TOWER PRICE $24.50

BRIDI RCM BASIC TRAINER

- ★ 50" Wide Span — 410 Sq. Inch Wing Area.
- ★ .09 to .19 Engine Displacement.
- ★ 3 lbs. Total Weight (with 4 channels).
- ★ Machined Parts and Hardware Included.

RETAIL $27.95 ONLY $20.50

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Grand Esprit	119.95	92.50
Super Esprit	149.95	115.00
Skyhook	29.95	24.00
Cumic	49.95	40.00
ASTRO-FLITE (AFI):		
ASW-17	$ 69.96	$ 53.00
Monterey	34.95	24.75
Malibu	25.95	19.25
Fournier RF-4	29.95	21.50
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J&J:		
American Eagle	$ 36.95	$ 26.00
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Lil "T"	$ 16.95	$ 11.75
Ez Juan	29.95	20.50
JP MODELS:		
Dart	$ 44.95	$ 36.00
Dart II	55.50	43.00

RC ENGINES . . .

ENYA:		
.09 III TV	$ 17.25	$ 12.95
.15 III TV	19.25	14.50
.19 V TV	21.98	16.50
.19 BB TV	33.98	24.50
.29 IV TV	25.25	18.95
.29 BB TV	31.75	22.50
.35 III TV	26.75	20.00
.45 BB TV	45.50	32.75
.60 III BB TV	68.25	44.50
FOX:		
.15 RC	$ 16.95	$ 12.00
.19 RC	20.95	14.75
.25 RC	20.95	14.75
.29 RC	24.95	17.00
.36 RC	24.95	17.00
.40 RC	26.95	18.50
.60 RC Falcon	37.95	25.50
.60 RC Eagle	53.95	35.50
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K & B:		
.40 RC W/Perry	$ 37.00	$ 25.75
.15 RC W/Perry	37.00	25.75
NORTHFIELD-ROSS		
Twin Cylinder:		
Aluminum finish	$125.00	$106.00
Black Anodized	145.00	124.00
O.S. MAX:		
Pet .099 RC	$ 10.98	$ 9.50
.10 RC	14.98	12.00
.15 RC	19.98	16.00
.20 RC	21.50	17.75
.25 RC	23.50	19.00
.30 RC	24.50	20.00
.30 RC Wankel	87.50	68.00
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.50 RC	42.98	31.50
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G 15 Diesel RC	$ 33.98	$ 27.00
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G 60 RC Bluehead	59.98	47.75
VECO		
.19 RC	$ 31.00	$ 21.75
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.40 RC Blackhead	$ 68.50	$ 45.00
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Triton	$ 39.95	$ 29.00
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Sport Evolution	21.95	16.00
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Falcon 56	$ 19.95	$ 13.95
Senior Falcon	36.95	25.50
Skyland 62	36.95	25.50
Skylark 56	22.95	16.75
Ranger 42 ARF	19.95	13.95
Shoestring 54	29.50	20.75
HOTLINE:		
Me-109	$ 59.95	$ 38.00
Comanche	54.95	35.00
Mooney Chaparral	54.95	35.00
Sierra Trainer	44.95	28.50
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Mini-Comanche	29.95	19.50
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Mark V Eyeball	$ 54.95	$ 42.50
J-Craft	45.95	32.00
¼ Midget Mustang	29.95	21.50
Banshee	54.95	38.00
JENSEN:		
Das Ugly Stick	$ 49.94	$ 39.00
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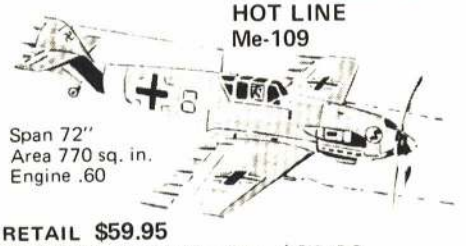

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CURTISS R3C-1&2

The Golden Age of Aviation was really the golden age of seaplanes.

From the earth-awakening flight of Lindbergh in 1927 until the war clouds began to darken in early 1939, the fastest airplanes in the world were not the super-exciting GeeBees or the prototype Spitfires and Messerschmitts or even the secret pursuit planes tested for the Army Air Corps. They were very special machines with ponderous pontoons hanging below their wonderfully streamlined fuselages. They were the racing floatplanes created exclusively for the Schneider Trophy Races.

From 1924 until 1927, the world absolute speed record had been held by Bonnett, a Frenchman, flying a Ferbois landplane at 278 mph. But in late 1927, Italian Mario deBernardi upped the mark to 298 mph with a Macchi M-52 seaplane developed from the M-39 in which he had won the 1926 Schneider Race. He soon raised the mark to 318 mph with the same airplane. In 1929, it went up to 358 mph when a British Supermarine S-6 seaplane made an official run, but the Italians returned with a vengeance. While their radical tandem-engined Macchi M-72 never made the grade in the Schneider seaplane contests, Francesco Agello boosted the speed record with it to 424 mph in 1933 and then to 441 mph in 1934. This mark stood until the obscure Me-209V-1 broke it almost five years later.

And where was the United States all this time? Mainly concerned with the speed record for landplanes, which it held from 1923 to 1924, and again from 1932 to 1934 and from 1935 to 1937. Of the seven American airplanes which held the record during that period, four were built by Curtiss. They were part of the great series of Curtiss military racers which had been the beneficiaries of heavy government support for the development of high-speed airplanes through racing.

The active cooperation between Curtiss and the military on racers began in 1921, with the appearance of the R-1 (No. A-6080). This sleek biplane was powered by a 400 hp Curtiss D-12 engine which enabled Curtiss test pilot Bert Acosta to win the 1921 Pulitzer Trophy Race at 177 mph. For 1922, the Navy was ready with that airplane and its sister-ship—the R-2 (No. A-6081). Lt. Harold Brow placed third in the 1922 Pulitzer Race in the new airplane, while Lt. Al Williams was fourth in the older ship. Both airplanes were then converted into seaplanes by the addition of twin pontoons; as R-3s they captured the Schneider Trophy. Lt. David Rittenhouse was the winner of the prestigious event in A-6081 at 177 mph (with great pontoons, remember!), and Lt. Irvine was second at 173 mph.

Also entered in the 1922 Pulitzer Race was a pair of Army Curtiss racers originally called CR-2 but later changed

to R-6. Lt. Russell Maughan won the race in No. P-279 at 206 mph, and Lt. Maitland was second at 199 mph in No. P-278. Both airplanes then flew in the 1923 Pulitzer, Lt. Corkill placing sixth in P-278 at 216 mph, and Lt. Miller fifth in P-279 at 219 mph. In the 1924 Pulitzer, P-278 disintegrated at the start, killing Capt. Burt Skeel, while Lt. Brookley went on to place second at 215 mph in the 1922 winner. The R-6s held the speed record several times: Billy Mitchell flew P-279 at 223 mph in 1923; Russell Maughan flew it 237 mph in 1923, and then Maitland flew P-279 240 mph a short time later. The Curtiss racers were making a lot of history.

If the performances of the two R-6s in the 1923 Pulitzer were a disappointment, Curtiss more than made up for it with its two new R2C-1s—a pair of larger, but more streamlined, Navy racers. Al Williams won the race in No. A-6692 at 244 mph, closely followed by Harold Brow in No. A-6691 at 242 mph. Brow later took the world speed record away from Maitland's R-6 with a run at 259 mph, only to be topped immediately by Al Williams with 267 mph.

But it was the 1925 Pulitzer that saw the start of the final, superb series of Curtiss racers: The R3Cs. This was a joint Army/Navy project, with No. A-6978 and No. A-6979 going to the Navy, and No. A-7054 to the Army. The airplanes took the 1925 Pulitzer Race at record speed and left everyone else far behind. Army Lt. Cyrus Bettis was the winner in A-7054 at 249 mph, Navy Lt. Al Williams was second in A-6979 at 242 mph.

That was the end of the Pulitzer Trophy Races, but not of the R3Cs. They were quickly modified into R3C-1s by the attachment of twin floats and entered in the Schneider Race of 1925. There they caused a sensation, being far and away the most streamlined water-borne flying machines the world had ever seen. In this they heralded the great racing seaplanes to come, for which the Schneider will always be remembered. Prior Schneider racers had been worthy efforts, but little more. From 1925 until the trophy was permanently retired in 1931, it would attract the most exciting aircraft in the world.

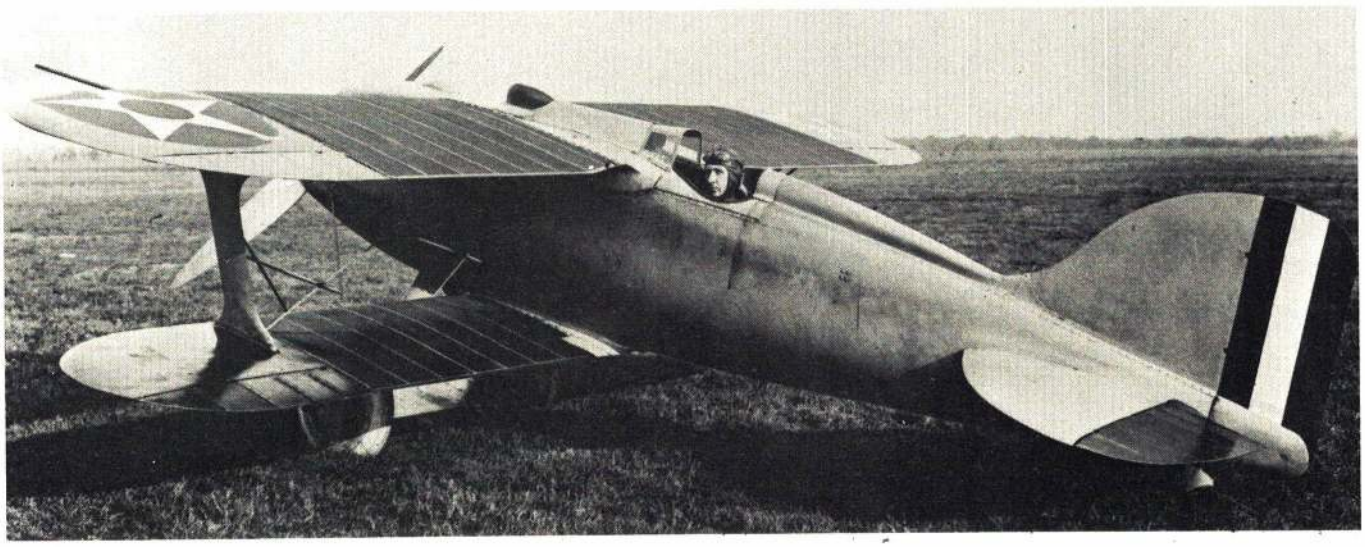
In 1925, however, it was strictly an intramural contest between the Army's Jimmy Doolittle in the Pulitzer-winning A-7054, and the Navy's George Cuddihy in A-6979 and Ralph Oftsie in A-6978. Doolittle won it with almost 233 mph to break the Schneider record by an amazing 45 mph. The others failed to finish.

For the 1926 Schneider, Doolittle's A-7054 remained much as it had been, except that the pilot was Lt. Christian Schilt. Oftsie's R3C-2 (A-6978) became the R3C-3 with the change from a Curtiss D-12 engine to a Packard 2A1500, and the addition of a slick, symmetrical cowling; pilot, Lt. William Tomlinson. The final R3C-2 (A-6979) got a new Curtiss V-1550 engine to become the R3C-4, while retaining Cuddihy as pilot. Part of the reason for this major effort to gain speed can be explained by the rules of the Schneider Trophy, which awarded permanent possession to the nation which won three times in a row. The U.S. had already won two in a row, and was smelling roses.

But it was not to be. Tomlinson's R3C-3 was wrecked during trials at Hampton Roads, Virginia. Cuddihy once again was forced to pull out before he had completed the race. Schlit did his best, averaging barely 1 mph faster than Doolittle's 1925 winning speed, but not fast enough to catch deBernardi, who clocked 242 mph in his Macchi M-39. Schilt's airplane, repainted like the R3C-2 of Doolittle, is now at the USAF Museum, on loan from the National Air and Space Museum.

(Continued on page 79)

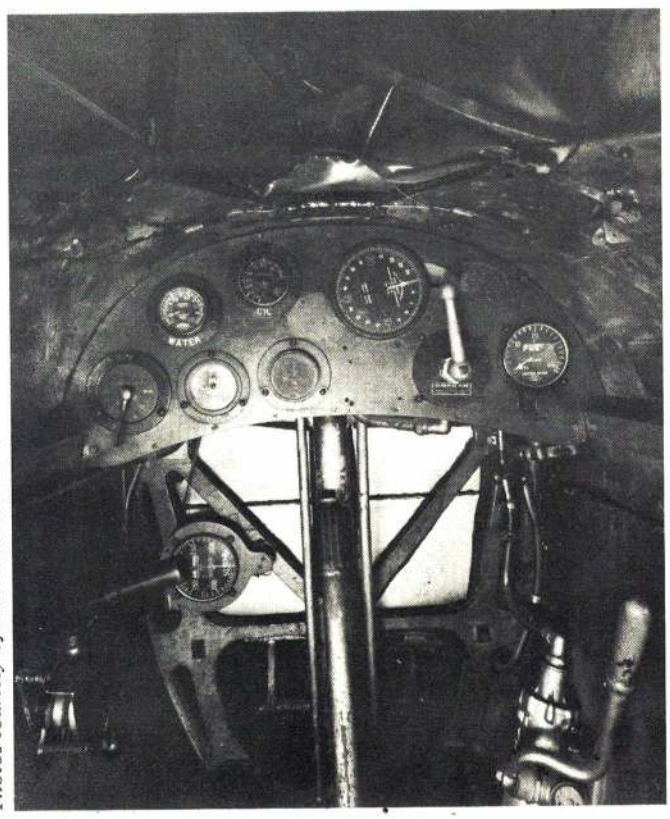
In 1925 America had the fastest and prettiest land and seaplane racer. Curtiss designed it for the U.S. military to go racing! / by Don Berliner

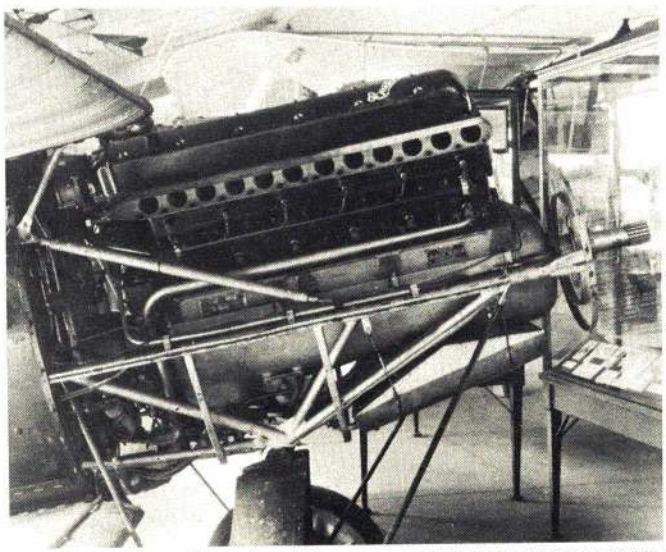


Pulitzer Trophy version—R3C-1—was much cleaner and lighter. Three of them dominated these races thanks to abundant power and excellent streamlining.

Opposite: The great Jimmy Doolittle and the R3C-2 he flew to victory in the 1925 Schneider Trophy Race at record speed of 233 mph even with the drag of floats and wires.

Photographed at the Smithsonian in Washington, D.C. is the cockpit. Only the bare minimum of instruments needed for racing are there.

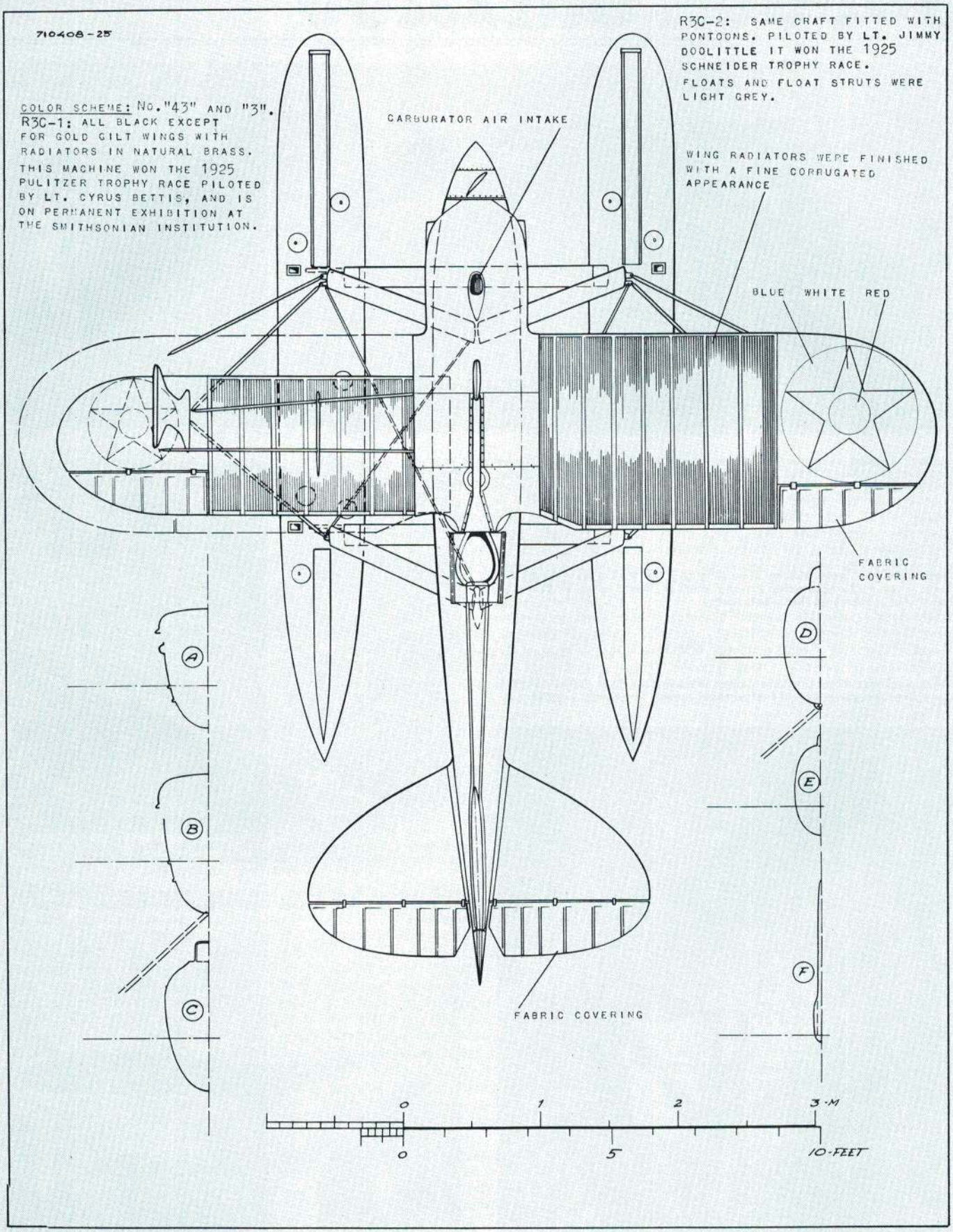


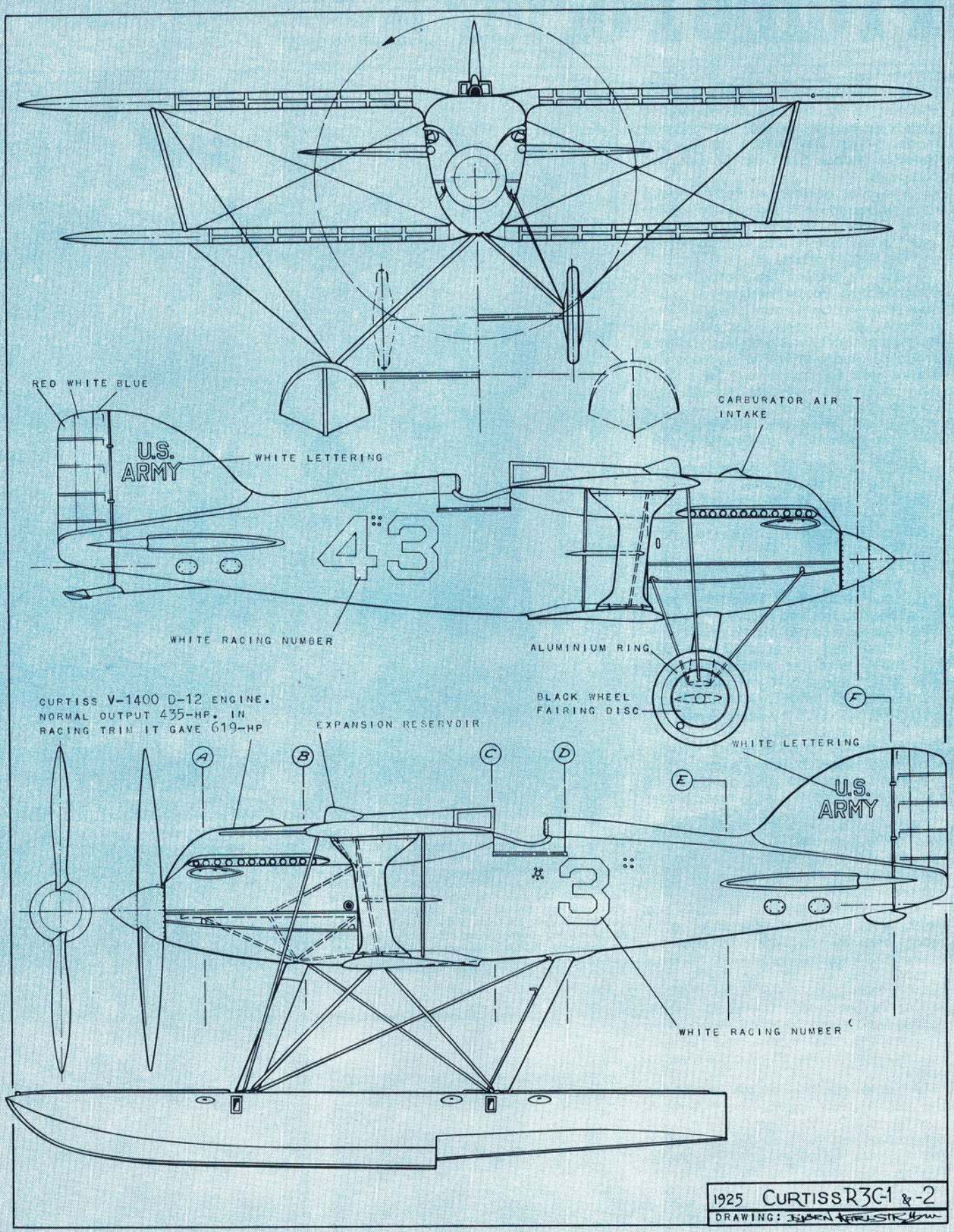


A mighty Curtiss D-12 engine. The scream of this hefty V-12 is said to have been one of the most memorable sounds of air racing.

Even without wheel pants, landing gear arrangement is rather clean. Note lead drag wire extends from hubcap over the axle to which it is attached.

Photos courtesy of the Smithsonian Institution


710408-25
R3C-2: SAME CRAFT FITTED WITH PONTOONS. PILOTED BY LT. JIMMY DOOLITTLE IT WON THE 1925 SCHNEIDER TROPHY RACE.
FLOATS AND FLOAT STRUTS WERE LIGHT GREY.
COLOR SCHEME: No."43" AND "3".
R3C-1: ALL BLACK EXCEPT FOR GOLD GILT WINGS WITH RADIATORS IN NATURAL BRASS.
THIS MACHINE WON THE 1925 PULITZER TROPHY RACE PILOTED BY LT. CYRUS BETTIS, AND IS ON PERMANENT EXHIBITION AT THE SMITHSONIAN INSTITUTION.
CARBURATOR AIR INTAKE
WING RADIATORS WERE FINISHED WITH A FINE CORRUGATED APPEARANCE
BLUE
WHITE
RED
FABRIC COVERING
A
B
C
D
E
F
FABRIC COVERING
0
1
2
3-M
0
5
10-FEET


RED WHITE BLUE
U.S. ARMY
WHITE LETTERING
CARBURATOR AIR INTAKE
43
WHITE RACING NUMBER
ALUMINIUM RING
BLACK WHEEL FAIRING DISC
CURTISS V-1400 D-12 ENGINE. NORMAL OUTPUT 435-HP. IN RACING TRIM IT GAVE 619-HP
EXPANSION RESERVOIR
A
B
C
D
E
F
WHITE LETTERING
U.S. ARMY
3
WHITE RACING NUMBER
1925 CURTISS R3C-1 & -2
DRAWING:

Profile Porter

FOR THE TENDERFOOT

Quick-to-build rubber job looks quite real when trimmed with felt tipped pen. Flies like a dream. / by Bruce Pailet.

This Profile Porter is easy to build and fun to fly. It is a rubber-powered, semi-scale version of the Turbo Porter model which has placed second and third in Indoor Scale at the last two Nationals.

A number of different Porter models have appeared in magazines in recent years. There have been Pilatus Porters and Turbo Porters and Peanut Porters and Sea Plane Porters.

Now we present the Profile Porter, designed by a young modeler for young modelers. If the instructions and illustrations are followed correctly, the finished product should be one you'll be proud of, and one which we hope will inspire you to "move up" to a fully built-up (frame and tissue) model for your next attempt.

You will need the following basic materials to build your Profile Porter:

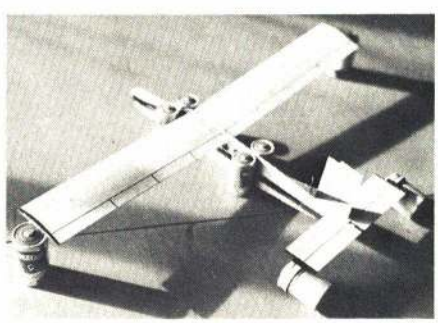
(a) 1/32 x 3 x 36" balsa sheet for wing and tail surfaces.
(b) 1/8 x 3 x 15" balsa sheet for fuselage.
(c) Scraps of 3/16" balsa for nose blocks.
(d) Pair of 7/8" dia. wood or plastic wheels.
(e) Small amount of 1/16 sheet balsa for wing ribs and braces.
(f) Five-in. wood or plastic prop.
(g) About ten in. of .020 and .025 music wire for landing gear and 1/32" music wire for prop hook.
(h) Scrap 3/8 balsa for exhaust stack.
(i) Strip of 1/16" square balsa for wing leading edge.
(j) Hardwood "nose button."
(k) Such model building supplies and tools as straight pins, glue, pair of pliers, and single-edge razor blade.

Prior to actually starting construction of the Profile Porter we recommend that you follow a procedure used on the original which differs a bit from our usual model-building approach.

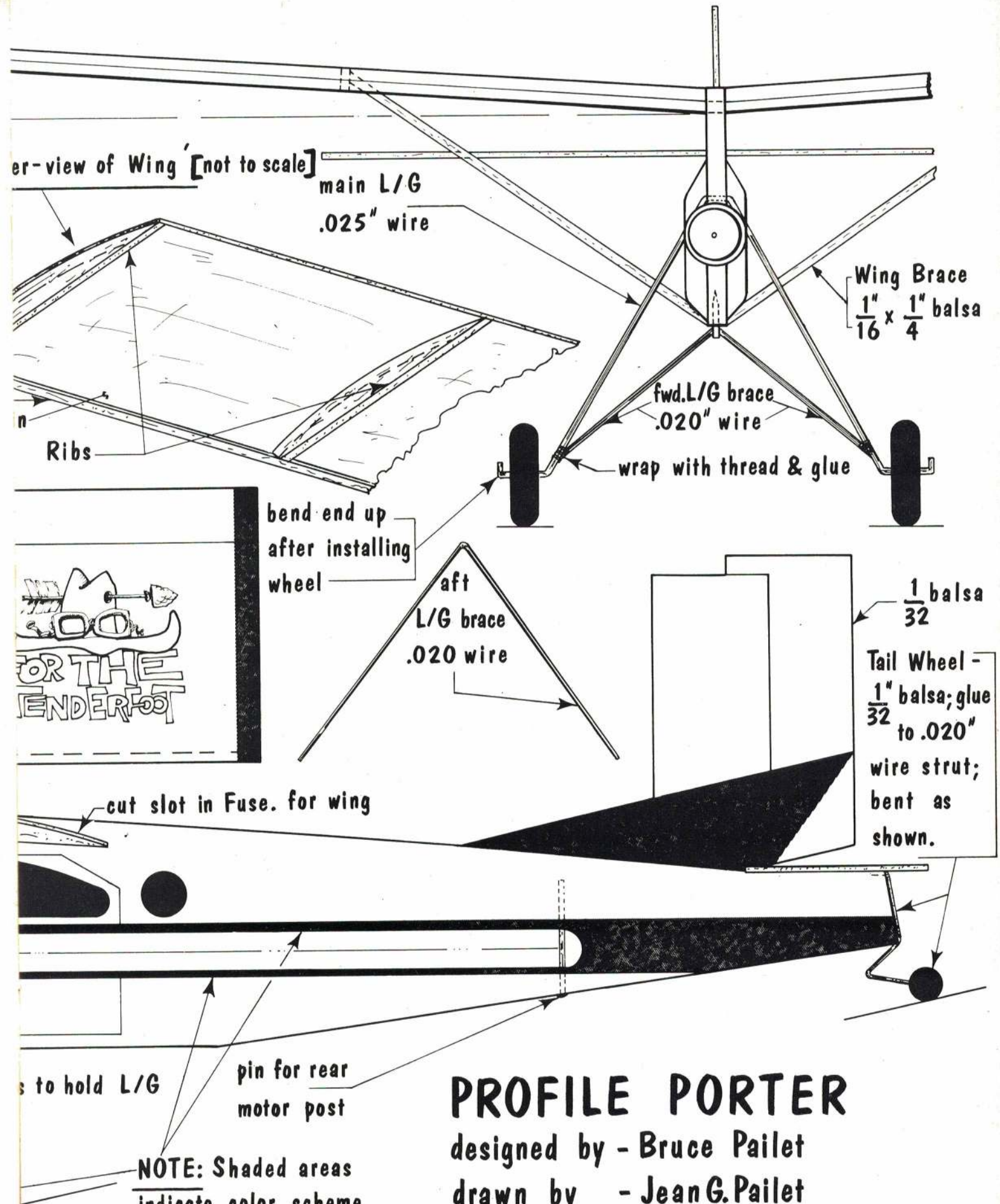
It is common practice to apply the finish (color/paint/trim/decals) to a model after all the parts have been assembled. However, due to its all-balsa construction, it is easier to apply the color scheme and trim details to the Profile Porter before the parts are assembled. You will be able to work with almost all flat balsa parts on a flat surface, which makes it much easier to operate.

All color and trim details, except for the decals, were applied with felt-tip pens on our Profile Porter. The natural balsa color was used as the light color (to simulate white) and black was used for the dark color. Any similar arrangement of colors is acceptable—you can suit your own taste. The plans and photos show what portions of the model should be colored to give it a reasonable scale-like appearance.

(Continued on page 80)



Above: Author launches model rather nose high, but this STOL plane flies right on up. Below left: Completed model is trimmed in black against natural balsa. Don't wet the balsa with the coloring tool, just lightly draw on the wood. Below right: Except for license number decals, all trim is by felt tip pen. Do all trimming before final assembly. Bandage on author's thumb indicates why instructions call for use of single- (not double-) edge razor blade during construction.



PROFILE PORTER

designed by - Bruce Pailet

drawn by - Jean G. Pailet

inked by - Paul Simon

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Wing Area: 803 sq. in.

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KIT FF-7

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Engine: .60

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KIT FF-23

Wingspan: 20"

ZLIN AKROBAT

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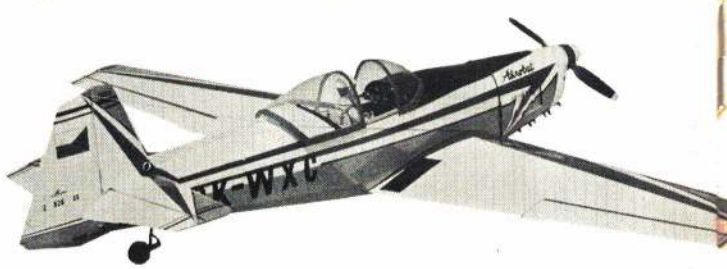

KIT RC-23

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Engine: .60
Wingspan: 70"

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NERS GROW
CHAMPIONS

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KIT
FF-16

570"
-.35

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Engine: .049-.051

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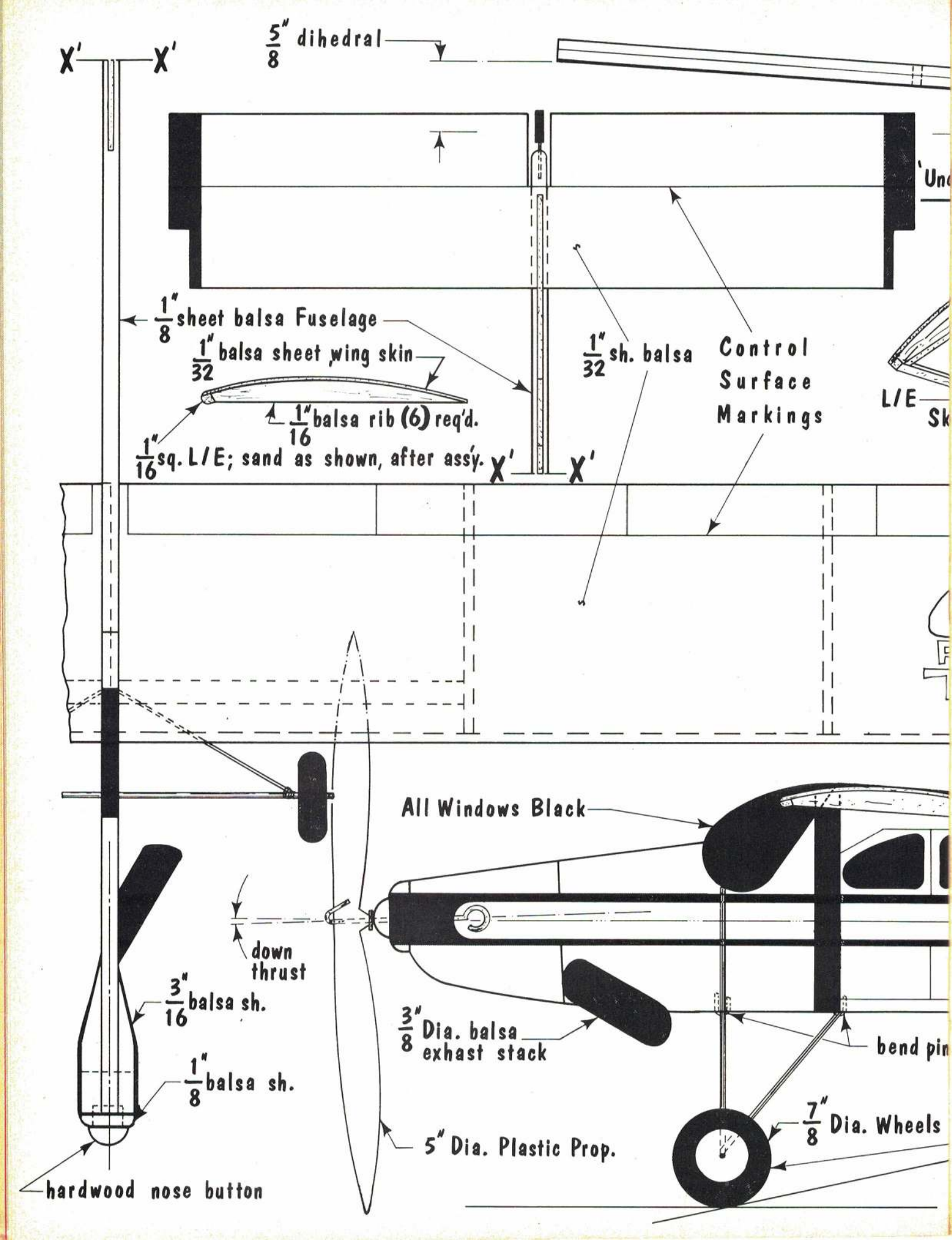

X'
X'
5/8" dihedral
1/8" sheet balsa Fuselage
1/32" balsa sheet wing skin
1/16" balsa rib (6) req'd.
1/16" sq. L/E; sand as shown, after assy.
1/32" sh. balsa
Control Surface Markings
L/E
All Windows Black
down thrust
3/16" balsa sh.
1/8" balsa sh.
3/8" Dia. balsa exhast stack
bend pin
7/8" Dia. Wheels
5" Dia. Plastic Prop.
hardwood nose button

MODELER MAIL

(Continued from page 8)

I have a comment concerning a "News Bits" item appearing in the February 1973 issue of AAM. The article I refer to is "Maybe it Stalled." Actually my remarks apply to several other assorted comments that are published concerning the actions of an aircraft in flight.

In this particular item, one of the causes for the stall and subsequent crash is given as ". . .the loss of head wind reducing the airspeed. . . ." This statement is not entirely correct. Once any aircraft is airborne, it flies in the air environment, and is subject to movement of its environment. The fact that a turn is made while the wind is blowing does not by itself cause the stall. Unless the wind is gusty, when the craft could be considered to move from one "block" of air to the next and a loss of airspeed thereby experienced, the tendency to stall in a turn is no greater than if the craft were moving through calm air. The most likely cause of a stall on takeoff during the crosswind turn is a combination of insufficient airspeed, excessive angle of attack, too steep a bank and possibly crossed (uncoordinated) controls.

The problem for the modeler is not being able to accurately judge the airspeed of his craft. The secret is airspeed, not groundspeed. Pilots of light aircraft suffer the same dangers on takeoff or landing especially in a crosswind condition. Here the pilot judges his speed by noting the trees, etc., that go by below him and does not observe his airspeed indicator. This error sometimes proves fatal! The pilot of the real aircraft has the advantage of the airspeed indicator, the turn and slip indicator, an artificial horizon, a rate of climb indicator and an altimeter. Surely, he can ignore all of these but usually most are available to tell him about the aircraft's attitude and airspeed.

Concerning the reaction of a turning aircraft which stalls (accelerated stall), generally it is the high wing that stalls first and falls off, not the lower wing.

Other comments I have noted are trying to stop the dip of the nose while making a "rudder only" turn or an aileron only turn. This is a normal reaction of almost every real aircraft, and cannot be avoided.

I would like to recommend a book that is readable and highly informative, *Stick and Rudder* by Langewiesche. An ever better way to be convinced of what happens to an aircraft during single controlled turns is to experience it. I'd suggest investing about $7.50 for a short ride and asking the pilot to make some rudder only and aileron only turns. He probably will be unwilling to do any stalls with a paying passenger aboard unless he's actually giving licensed instruction.

I am a licensed commercial pilot and have been a model aircraft builder since about 1947, off and on, a beginner in RC, and a registered professional engineer. I am not an expert modeler nor the world's greatest pilot, but I have a certain confidence that I am competent.

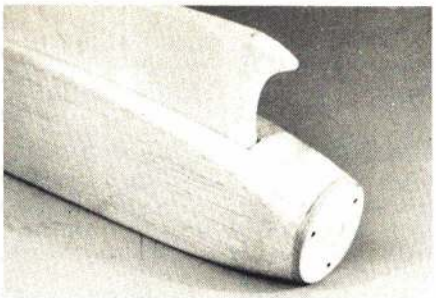
D. Plunnecke, LCDR, CEC, USN, Seoul, Korea

Star Duster, not Witch Doctor

I am writing this letter regarding the article "The Giants of Free Flight" that appeared in the April 1973 AAM. The article has listed me as flying a Witch Doctor. This is an error. The model I was flying is a Star Duster 900. I have been flying the same Star Duster since 1964. Since the article will receive wide attention, I would like to see Sal Taibi receive the credit due him for his excellent design.

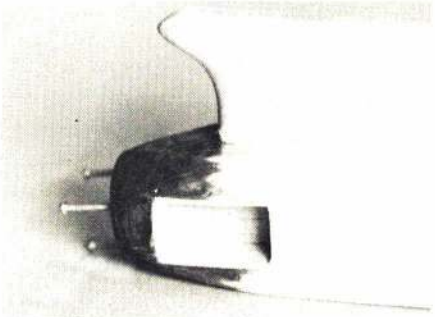
Walter J. Ghio, Stockton, Calif.

Order the plans for your next model from our plans service on page 84

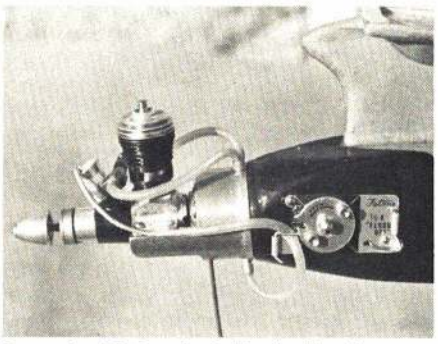


Front end for Tatone tank version of fuselage.

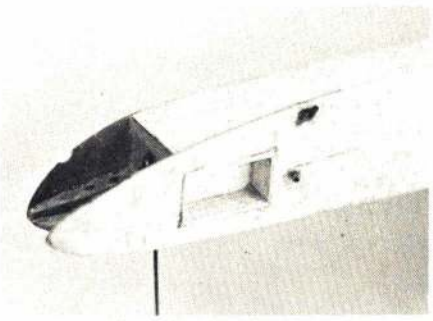
Pen bladder pressure, pinch-off system. OK for lower nitro fuels—high nitro burned out plugs for the author. See text.



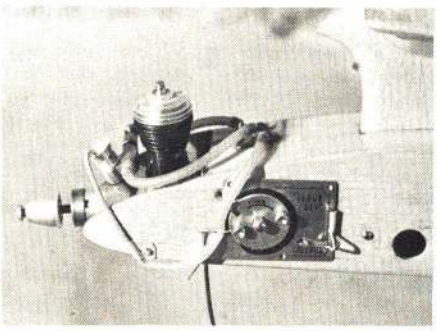
Make a box to house timer chassis. Epoxy to keep fuel out of fuselage. Silk secures firewall.



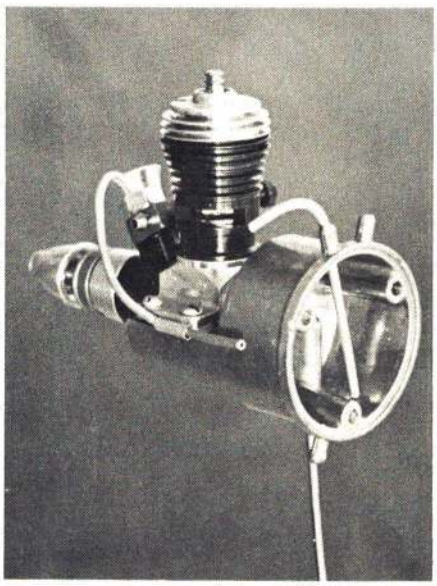
Pressurized Tatone tank flood-off system.



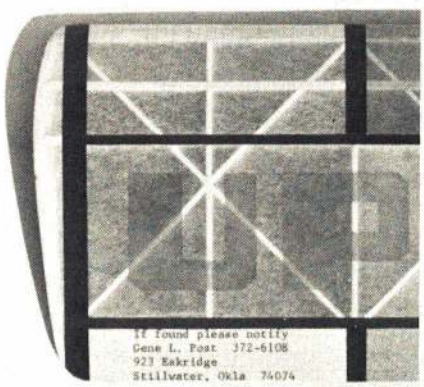
Cowled version with No. 5 Perfect tank enclosed. Timer box of 1/16" sheet.



Cowled version of fuselage with pressure fuel system and internal fuel tank.



Flood-off nozzle and second fuel pick-up for Tatone pressure. See text.



Getting the stab through the typewriter is some trick. It's easier to type ID on a piece of tissue and dope to trailing edge.

UPPER CRUST

(Continued from page 21)

now. Also, cut in the curve (top view) of the motor bearers. Now sand (carefully!) the appropriate bevel in the top and bottom sheets. See the cross section drawings on the plans for clarification.

Cut two 1/32" sheet sides, slightly oversize and glue in place. Because of the twist required in positioning the side sheets, numerous pins must be used to hold them in place. The sheets should extend forward and the ends glued to the 1/8" sq. pieces just behind Former A, but *not* to the former itself. If the Tatone tank version is being built the sheets can be glued to the former. While the glue is drying, cut the 1/32" sheet ply cowling sideboards to shape and glue to Former A. Let dry and then glue the cowling sheets to the motor bearers, this way it won't be so difficult to hold the ply sheeting to the curve of the bearers.

While waiting for the glue to set on this assembly, build the pylon and sand to shape. When the pins can be removed from the fuselage sides, trim the sheeting to the top and bottom shape. Cut the two 1/32" sheet side doublers to size, sand the rearward ends to paper thinness, and glue in place, again using plenty of pins. The doublers should run forward over the ply cowling to the tip of the motor bearers. While this is drying, glue the pylon in place perpendicular to the bottom of the fuselage. Cut out the wing saddle and glue to the top of the pylon. Square it up and pin in place. Use 3/8" triangular stock as fill supports between the pylon and wing saddle. Cut the triangular stock to a streamlined shape at front and back. Again, refer to the cross sections for clarification.

Cut the rudder from two pieces of 3/32" sheet and splice. When dry, glue to the fuselage. The rudder extension should be glued the the fuselage bottom sheet. Align the rudder with the pylon and pin in place. Cut out the stab seats and glue in place. Use balsa as fillets to support the seats. Shape a piece of ¼" sq. spruce and glue in place as the stab stop.

Cut a rectangular opening for the fuel cut-off timer in the left side just behind the firewall. Build a 1/16" sheet box just large enough to encase the timer housing and glue it in the timer opening. The timer can then be "set-in" the box. Coat the inside of this box thoroughly with epoxy glue to make it fuelproof. This keeps the front end from soaking up a lot of fuel.

Cut a 1/8" dia. hardwood peg about one-in. long and glue in place for the dethermalizer rubber band. Cut a piece of 9/32" aluminum tubing and glue in place for the DT snuffer tube. The peg and tubing are positioned in the left side just under the pylon. (See plans for location.)

Set your TeeDee 049 or 051 on the motor bearers, mark the lug holes and drill out for 3-48 size bolts. Position 3-48 blind nuts in these holes on the bottom side of the bearers. Make sure

(Continued on page 89)

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ORBIT MICRO AVIONICS
JIM McNERNEY

The Micro Avionics system is the Orbit entry in the sport series competition begun by Kraft about a year ago. The idea is to provide a full five-channel digital system with NiCads and four servos at a price competitive with kits and foreign imports. This is done by cutting out frills and extras and reducing the options available to the customer. Resulting radios are good solid units, more than adequate for the sport flier.

The Micro Avionics system is available on both Citizens' Bands and six meter frequencies. It comes complete with servo trays, charge cords, frequency flags and, a real bargain, a fine owner's manual with copious photographs and illustrations showing proper installation, operation and care of the radio system. Other manufacturers please note!

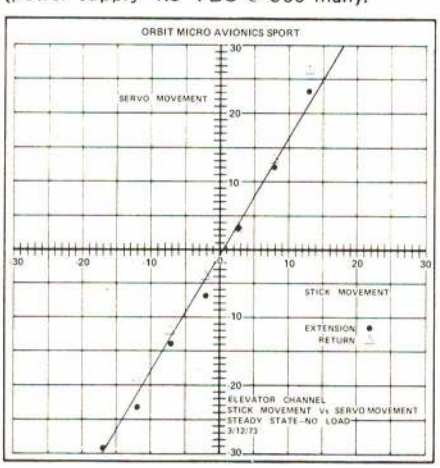
Transmitter: The box is orange vinyl-clad aluminum. Orbit sticks with nylon gimbals are used. The charger for TX and RX batteries is built into the transmitter. Both RF and encoder sections use discrete components throughout. The RF section on the 72.96 MHz unit tested was completely shielded and power supply and encoder outputs contained RF chokes.

Receiver: Both the RF and decoder sections are mounted on the same board. The RF section has a double-tuned front end with three stages of IF at 455 kHz. The decoder uses a single IC. Control outputs terminate at two plug blocks with six in. of wire lead. One block has rudder throttle and elevator, the other has aileron, aux. and a blank. A separate male power plug connects to the switch harness or directly to the battery. The switch harness comes with a charge receptacle which has a screw-held cover to protect contacts when not in use.

Servos: The PS-4 mechanics are used with a bridge amplifier containing the Orbit IC. This IC contains the output transistors and is made for Orbit by Texas Instruments.

General Comment: The Micro unit is a good, solid unit which met or exceeded the manufacturers specifications in test. It is recommended for the sport flier who wants a light, reliable system. As aforementioned, Orbit has added a couple of "goodies" which will probably be seen with other manufacturers' sets eventually.

Specifications: Transmitter Power—0.9w to final (power supply 9.6 VDC @ 500 mah); **Operating Time**—4 hours; **Temp. Range**—10° to 150°F; **Pulse Width**—1.65± .5 ms; **Pulse Rep Rate**— 60/sec.; **Servo Transit Time**—0.6 sec.; **RX Band Width**—3 kHz @ 6 db; **Sensitivity**—1.8 μv; **Airborne Weight**—11.75 oz. (power supply 4.8 VDC @ 500 mah).



PILOT THERMUL
STEVE KRANISH

The Pilot Thermul is a medium-sized thermal or slope soaring glider, with optional power assist. It is of standard almost-ready-to-fly construction. The fuselage, with integral stab platform and fin, comes completely assembled, including the plywood radio compartment. The rudder is also supplied assembled, with hinges riveted in place, so that it needs only to be bolted to the fin. The pre-covered balsa stabilizer comes with the plastic tips attached, and the pre-covered elevator is simply cut to length and attached with the metal hinges provided. Stabilizer attachment is merely four bolts, so it is removable for storage and/or shipping. The hatch is assembled from two pieces, and held in place by sliding the front into the fuselage, and placing the wing over the rear edge.

Wing construction is quite simple. The foam panels come covered, and the leading edge reinforcement, spars, and tips have been installed. A plywood root rib must be epoxied to each panel, along with the plastic center section, trailing edge, and leading edge covers, which are attached with the plastic cement provided. A hole is then drilled into each root rib, and brass joining-wire tubes are epoxied into place. The tubes must be sanded t, roughen them and allow the epoxy to hold them. Sheet plastic stiffeners are added over the spars on each panel. The two-piece wing is assembled on a single pre-bent wire joiner, and held together by a rubber band stretched between wood screws driven into the spar on the bottom of each panel.

The power pod comes completely assembled. It consists of a plywood framework with a plastic cover. A hole is drilled through the pylon for the wire joiner to pass through, and the unit is placed between the two wing panels. The engine mounting beams are spaced to take a 1.6 to 2.5 cc engine, although the manufacturer recommends a 1.6 cc engine. Power for our Thermul was occasionally provided by an ancient Frog diesel, which had sufficient power to pull the glider aloft.

There is plenty of room for almost any radio in the nose. Servo rails are easily attached to the plywood inner sides. The fuselage provides fairings for the nylon type of pushrod.

The Thermul is an excellent prefabricated kit, with all of the difficult work completed at the factory. The instructions, however, are quite poor, being just a couple of mimeographed sheets. While they are sufficient to build the model from, they would be almost no help to a rank beginner.

The kit is sold by World Engines, Inc., 8960 Rossash Ave., Cincinnati, Ohio 45326.

Specifications: Pilot Thermul

Flat-bottomed airfoil
Wingspan—80 in.
Wing Area—560 sq. in.
Flying Weight with AAM Commander and 500 mah battery installed—3 lb. 4 oz.
Additional weight of power pod—9 oz.
Price—$59.95

ACE DIGITAL COMMANDER
JIM McNERNEY

The Ace R/C Digital Commander is a lightweight, two-channel digital proportional system designed by Fred Marks. The system was featured in a series of AAM construction articles last year. Component kits can be purchased separately or as a system from ACE R/C Inc., Higginsville, Mo. 64037.

For purposes of this evaluation, the kits were constructed by young Steve Kranish, a DCRC Junior member, test flown in one of his planes, then given to me for a standard evaluation.

This evaluation is based solely on system appearance, function and measured characteristics and doesn't cover kit quality or ease of construction.

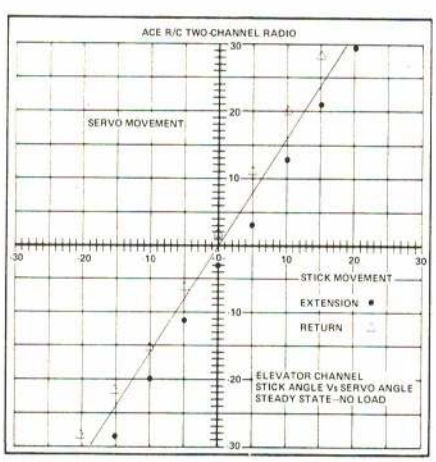
Transmitter: The transmitter utilizes a 9 volt dry battery. A Rand stick is utilized to provide dual axis control and trim. The antenna is center loaded. The antenna passes through a large rubber grommet in the case top and is secured by means of a screw mounted on the stick assembly. The screw can become loose or back out, making a poor antenna connection. The screw cannot be retightened without removal of the circuit board which is attached to the rear of the stick assembly. The encoder utilizes three ICs. The RF section (27 MHz) has only two adjustable components, a trimming capacitor and a variable inductance. There is no output meter.

Receiver: The RF section has a double-tuned front end and the usual three stages of IF. The decoder utilizes two ICs. The power supply is heavily filtered to reduce the effects of the World Engines ICs used in the servo amplifiers. The RF and decoder boards are stacked with foam spacers in a vacuum-formed plastic case.

Servos: The servos tested utilized D & R DS3P mechanics, but alternate D & R mechanics are available from ACE. The servo amplifier, as mentioned earlier, uses the World Engines IC which includes the output transistors, thus simplifying servo amplifier construction. The D&R mechanics are very light and fast with the bridge amplifier, but the thin gears are not designed for rough treatment.

The system will operate on 3.6 or 4.8 volts although 4.8 volts is recommended. This radio should be quite satisfactory for operation of small gliders and .15 or less powered aircraft.

Specifications: Airborne System Weight—8.2 oz. (includes two servos and 500 mah, 4.8 V battery); **Frame Rate**— 60/sec.; **Pulse Width**—1.5 + .5, -.4 ms; **Servo Thrust**— 22.5 in.-oz.; **Transit Time (stop to stop)**—0.6 sec.



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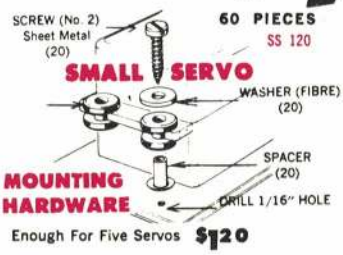

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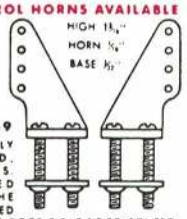

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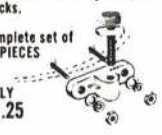

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CONNECTORS—AH79

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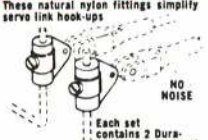

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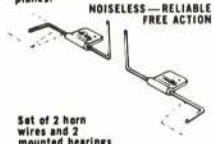

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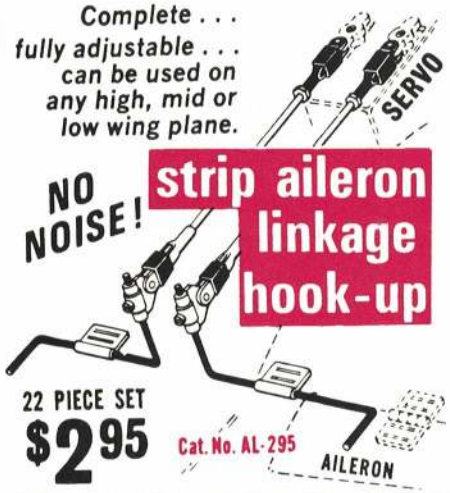

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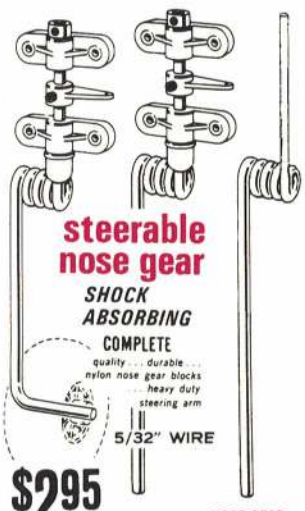

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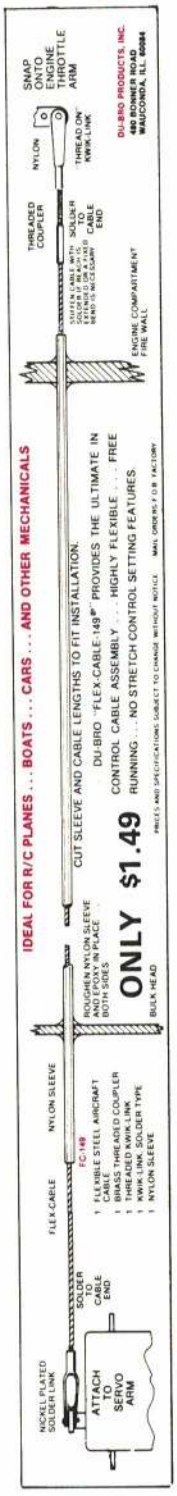

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TNT

TOLEDO

New Products Scene at Toledo. / by Eric W. Meyers, New Products Editor

During the weekend of February 24 and 25, the Lucas County Recreation Center was a place of beautiful airplanes, old friends, tired feet and crowds of people. Toledo was undoubtedly the center of modeling activity for that weekend; but amidst all the static displays, swap shops and flying demonstrations, the true purpose of the show remained clear—the introduction of new products. At that time a vast majority of the industries' radio control manufacturers met to show their innovative products to be released during the oncoming year.

Airplanes, in keeping with past years, had the most new items presented, as dictated by the industry's interest in that area. Some 40 new planes were displayed, out of which the majority were basically sport and beginners' ships. More and more manufacturers are developing trainer kits as the market for rugged, well-designed ships grows. A fairly new manufacturer, Jack's Custom Models, showed a balsa kit, *The Primer*, that appears to be a good standard trainer for those starting out on three-channel radios. In the plastics department, Mini Flite had a nice-looking plastic job that will surely get a novice builder in the air with a minimum of building time.

Pattern and aerobatic types must also be in high demand, as many manufacturers sported new ships for the coming year. Designs generally have smoother, cleaner lines, as evidenced by one manufacturer, Bridi Hobby Enterprises, which has transformed their boxish *KAOS* into a sleek, curvacious *Super KAOS*. Most ships call for use of retracts, and it seems as if the trend towards smaller, 40-sized pattern ships is constantly increasing. As far as materials are concerned, balsa will probably always remain the most popular, yet many of the new kits are using fiberglass fuselages, cutting the building and finishing time to a minimum.

Not as many new stand-off scale ships were shown as one might have expected, with the only new kits shown being a Top Flite *P-39*, a Handcrafted Models *Messerschmitt*, and a trio of ships from Long Island Hobbycrafts. A couple of full-scale kits were shown that were fine examples of how far manufacturers have come in providing complete, fairly easy-to-construct kits. One was Jack Staffords' *B-25*, a four-engined ship that should be a real earthshaker. The plane has a 90-in. span, uses 15s or 19s, and will sell for $100. The kit has a balsa fuselage and foam wing and uses molded canopies, turrets and cowls to add that "extra" touch. Bud Nosen showed a scale *P-47D* which he kits in razor-back and bubble canopy versions. Plans are also available for several other scale competition ships.

Quite a few new radios were seen at the show, basically because radio manufacturers annually redesign their products at this time of year, where airplane and engine people do not. Radios are one of the few products left in the world where the quality is going up and the prices are going down. Guarantees will be a big selling factor as several systems are now offering one year guarantees and other systems have minimal charges for complete repair (including crash) after the 90 day warranty expires. The main reason for these extended guarantees is the present widespread use of Integrated Circuits which are creating smaller and more reliable systems. D&R is now making an open-gimbal nylon stick assembly which is super-smooth and as a result is being incorporated in the RS, Cannon and Royal systems.

Auto pilots came on the scene this year, with both Kraft and World Engines showing prototypes of their products to be released this summer. These new inventions have two-axis stabilization and will sell for somewhere between $70 and $100.

New retract systems were not as prevalent at this show as they have been in years past. Whereas last year we saw no fewer than seven new systems, this year there were only two. There is no doubt that retracts are here to stay, however it seems that original ideas are being slowly exhausted, thus giving way to refinement and upgrading of present day popular systems.

The one new system of retract actuation, by Burco Molding, utilizes engine crankcase pressure through a pneumatic "servo." Known as the *Fail Safe* system, the servo puts out enough pressure to easily operate three retract gears and automatically cycles the gears to a down position in the event of engine failure. While the idea of harnessing engine crankcase pressure for such an operation is not original, it is the first time such a unit has been put into production.

Modelers looking for an actuation system might also be aware of Carl Goldberg's new servo which is completely independent of the radio system. Seen at the WRAMS show after Toledo, this "servo" is operated by two AA cells and micro switches. The system sells for a reasonable $29.95.

Cars are probably the easiest subject on which to report. Only one manufacturer displayed products at Toledo. This is quite a contrast to two years ago when there were ten companies at the show. Delta Systems showed their very well-engineered flex-pan chassis with upright engine. Also seen was Delta's special RC car control system featuring exceptionally fast (.3 sec. transit) and powerful servos. Boaters using steering struts might want to look into this servo.

Boating seems to be as popular as ever with all the "regulars" showing, plus the addition of a new manufactuer, EKIM, displaying a series of very exciting-looking fiberglass hydros. The Dumas booth sported a number of wild new boats—including a much needed 60-size offshore racer in typical ply and mahogany construction. Another new racer by Dumas is a 40-powered scale version of the Atlas Van Lines hydro. Movies were shown of both these boats and they appear well-designed and are very fast and exciting.

On the more peaceful scene, a couple of new scale tugs were shown by Fibo Craft and Hartman Fiberglass. Both of these new tugs use fiberglass hulls and wood superstructures and should create a fantastic scale effect on a pond or lake. Octura has a new 10°

tilted engine mount so those exhaust stacks can clear the boat sides more easily. This mount is interchangeable with earlier Octura mounts.

A couple of really hot new engines were displayed at the show. MRC-Webra had a speed engine that has either front rotor or rear rotor intake. Lou Ross demonstrated his new Wisniewski-designed powerhouse that really carted a seven-lb. airplane around the sky. 13,500 rpm were claimed with an 11-7 prop.

Helicopters were very much a part of the products at Toledo. Designs are generally becoming more complex in the search for a really good flying helicopter. Collective pitch control and gyros are two devices which seem to help a copter fly well. Du-Bro showed their semi-scale Hughes 300 that uses a modified O & R engine with gear box, clutch, and pull-starter all enclosed. This design is probably the simplest seen to date as the engine and drive train simply bolts into place. This copter performs very well as evidenced by the formation flying by five pilots in a demonstration flight. Another top-notch flying helicopter is the Bell Twin Jet produced by Graupner. This chopper utilizes collective pitch to overcome ground effect and shows some startline flying characteristics, displaying complete control in all situations. This kit also comes with a 60 engine and sells for about $500. Tower Hobbies showed an interesting system that converts the Hegi copter into electric power with a 1/5 hp motor. The copter is somewhat limited by the power cord, but is intended for in-house or backyard training and operates without the noise of a gas engine.

Speaking of electric power, this could be the mode of propulsion to come. Now there are three manufacturers producing electric power units specifically for airplanes. At the moment, size of the airplane is limited to several pounds, but larger motors are being developed. Electric power has some very obvious advantages over gas engines—starting, reliability, etc.—and as this form of power is still in its infancy, I think we can probably expect to see more coming this way.

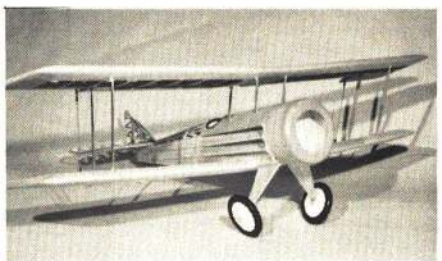
There were only a couple of new gliders at the show but this is hardly indicative of the popularity which soaring is experiencing at the moment. Airtronics had a new sailplane, the *Super Esprit*, a 154-in. span high performance soarer designed for Open class competition. Price of this very deluxe kit is almost the same as its wingspan, $150. WIK Models had a beautiful scale kit of the Salto sailplane which has V tail stabilators, fiberglass fuselage and built-up wings. Glider kits probably offer the widest range, not only in cost, but in size, from which a modeler has to choose a kit to suit his needs. Open class, high performance sailplanes are obviously getting more and more sophisticated with prices of the *Gran Esprits, Cumulus'* and others making these large soarers some of the most expensive kits on the market. On the other hand, much can be said for the low-cost, single- and two-channel gliders produced which are ideal for beginners.

We have seen the modeling field expand to great heights in the last year or so and have found ourselves on a plateau in concepts and designs. A possible exception to this is the auto pilots, which could be comparable to the same stage retracts were at about three years ago. In general, however, we are seeing refinement and redesign of products that have been in the field for some time. In any case, I'm sure the following pages will contain many interesting items for your inspection.

AIRPLANES

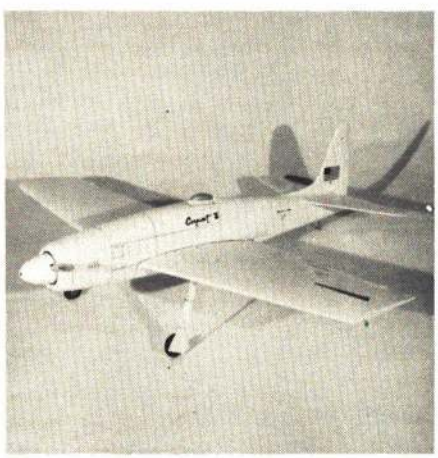
Photos by Eric W. Meyers

JACK'S CUSTOM MODEL/THE PRIMER—This 56-in. wingspan kit, designed with the beginning modeler in mind, features very basic construction and stable flight characteristics. For 19 to 25 engines, $25. Optional high-performance wing kit is available for additional $15. Jack's Custom Models, Inc., P.O. Box 226, Avenel, N.J. 07001.



STRATO MODEL PRODUCTS/BRISTOL BULLET—A kit of Hale Wallace's World War I fighter in a stand-off scale form. Wingspan is 48 in., length 41 in. for a 40 to 60 engine. Complete hardware package, formed cowl, and landing gear are included. With semi-symmetrical foil, the ship flies as easily as any pattern ship. $49.95. Strato Model Products, Route 6, Blakeley, Penn. 18447.

NEAL'S HOBBY SHOP/FUN-FLY MARK I—Miles Reed's first-place winner of the '71 and '72 Fun-Fly Nationals is available in kit form. For a 61 engine, all balsa kit has 46 3/4 in. span with 573 sq. in. area. $34.95. Neal's Hobby Shop, 4409 Mahoning, Warren, Ohio 44483.



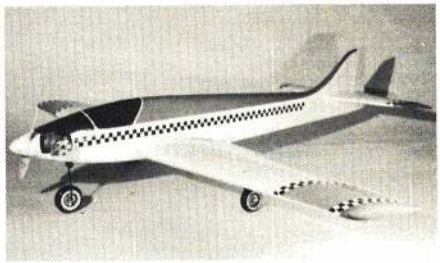
R/C KITS/F-8-F BEARCAT—Legal quarter midget racer has 10% thickness laminar flow foil. Kit has balsa fuse, foam wing and includes 1/16 in. sheeting. Will accept K&B or Supertigre engines. $21.95. R/C Kits Mfg., 3530 Briar Ave., North Canton, Ohio 44720.

LANIER/SPRINT 25—Easy flyer with a 25 engine, will take a 19 to 40. Has typical Lanier plastic-covered wings and plastic fuselage and a complete set of hardware, except for wheels and fuel tank. Fifty-in. span flies with or without ailerons. $42.95. Lanier Industries, Inc., Briarwood Rd., Oakwood, Ga. 30566.

JACK STAFFORD/P-39 AIRACOBRA—This stand-off scale "sportster" is designed for 40 to 60 engines and has a 53-in. span. Balsa fuse, foam wing kit includes molded canopy and formed gear. Can also be used for Formula II racing. $49.95. Jack Stafford Models, 12111 Beatrice St., Culver City, Calif. 90230.

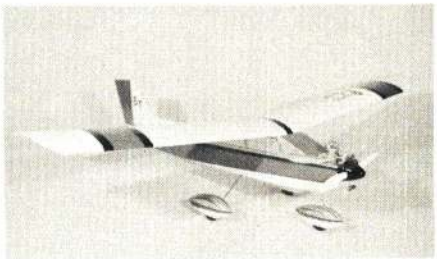
AERO PRECISION/PIPER VAGABOND—This semi-scale trainer is designed for three-channel radio and 19 to 30 engines. The airplane incorporates a high-lift flat-bottomed airfoil for easy building and flying. Uses ply construction and includes hardware pack. Fifty-two-in. wingspan, $32.50. Aero Precision, 322 Northeast St., Tipton, Ind. 46072.

BRIDI HOBBY/SUPER KAOS—Joe Bridi's contest winning *Kaos* is transformed into a beautiful pattern ship with the addition of retracts and compound curves. The 58½-in. wingspan ship is designed for 61 engines and is sure to prove highly competitive. $57.95. Bridi Hobby Enterprises, 1611 East Sandison St., Wilmington, Calif. 90744.



QUALITY PRODUCTS CANADA/SUPER ASTEROID—Modeled after Wolfgang Matt's *Superstar*, this pattern competition airplane has a fiberglass fuselage with balsa covered foam wing and stab with control surfaces shaped and sanded. Pushrods and hinges are included. For 60 engine, 64-in. wingspan, $79.95. Very short assembly time with this almost-ready-to-fly airplane. Quality Products Canada, 1296 Franquet Blvd., Chambly, Quebec, Canada.

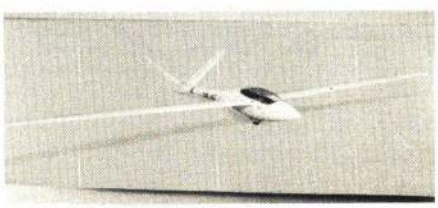
PB PRODUCTS/T2-A—This contest-winning pattern ship designed by Tom Atkins is a 90% fiberglass airplane with a fiberglass fuselage wing and stab. Sixty-four-in. span plane is for a 61 engine and four- or five-channel radio. Wings available with retract cutouts. Preformed canopy, balsa parts and all hardware supplied. $79.95. PB Products, 16443 Vanowen St., Van Nuys, Calif. 91406.



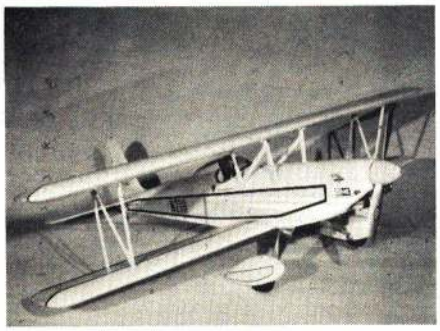
MINI-FLITE/THE BT—Construction of this beginner's trainer is balsa-covered wing, box-type balsa fuselage with crossover torsion bar landing gear. Flat-bottom foil wing requires no jig for easy assembly. For 09 to 15 engines and two- or three-channel equipment. $19.95. The Mini-Flite Co., 48 Princeton St., Redbank, N.J. 07701.

ACE R/C/WAR BIRD—This kit is adaptable to any one of three World War II semi-scale versions—a *Hurricane, Mk II, Me. 109E* or a *P-51B* (shown above). Kit features the Ace foam wing in two tapered sections and a constant section and has a span of 42 in. Designed for docile performance with Cox Babe Bee and rudder-only or for high performance with a TD 049 has two-channel digital. $17.95. Ace R/C Inc., Box 301, Higginsville, Mo. 63047.

MICRO MODELS/MERCURY—Bringing back the old-timers, this 020-powered rudder-only RC is a replica of Scientific's 1940 *Mercury*. Model is a one to two scale and has a 36-in. span. All balsa construction, $7.95. Micro Models, P.O. Box 1273, Covina, Calif. 91722.



WIK MODELS/SCALE SAILPLANE—This graceful sailplane has a modern V tail design with balsa wingstand stabilators, and a fiberglass fuselage. The scale Saito sailplane has ample room for four-channel installation. Complete hardware is included for ailerons, V tail mixer, wheel and wheel cover, plus many other items. Airfoil is an undercambered Eppler suitable for thermal and slope flying. Ninety-in. span. $64.95. Midwest Model Supply Co., 6929 West 59th St., Chicago, Ill. 60638.

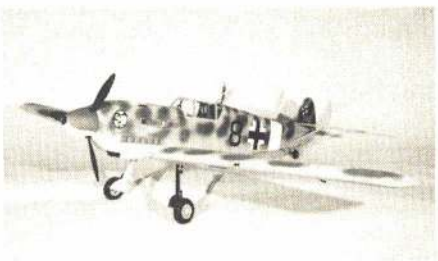


AIRTRONICS/ACRO-STAR—The sport biplane which follows the lines of the EAA biplane for Stand-Off Scale events has outstanding flight characteristics and uses 40 to 60 engines. Wingspan is 58 in. with 820 sq. in. therein. The kit features 1/8-in. ply-shaped sides and a complete hardware package containing more than 75 items. Cabane struts are pre-formed and wings are bolted on for better appearance. $69.95. Airtronics, 145 1/2 East Montecito Ave., Sierra Madre, Calif. 91024.

VIC'S CUSTOM MODELS/SCORPION—Two kit forms are available for this sleek 60-in. span AMA pattern ship. Both kits contain lightweight pre-finished fiberglass fuselage in full color with firewall installed. Kit No. 1 has foam wing and stab plus all balsa parts to complete the kit for $70. Kit No. 2 features .010 vinyl-covered wings and stab for $89.95. Both kits are available with retract mounts installed at additional cost. Vic's Custom Models, 618 Cowpath Rd., Montgomeryville, Penn. 18936.

AIRBORNE ASSOCIATES/NUTCRACKER—Jim Kirkland's design in a lightweight fiberglass fuselage and foam wing core kit. Fuselage has bulkheads, firewall, motor mounts installed. Sixty-two-in. span plane is for 61 power. Should be a winner. $59.95. Airborne Associates, 41106 Breezewood La., Annandale, Va. 22003.

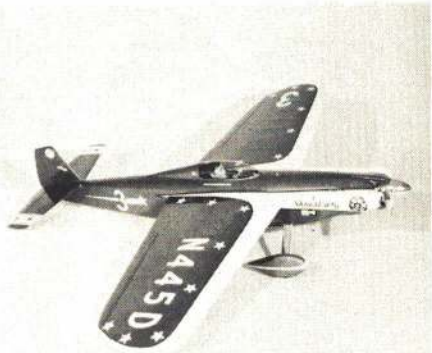
MACO/VAGA—This kit is designed for open pylon or stunting as it will complete AMA pattern with ease. Has balsa fuse, foam wing, with a special treated covering material that allows for the application of MonoKote or similar materials. The Vaga has a 56-in. span and is for 29 to 45 engines and will accept retracts. Kit also includes fittings and a fuselage building tray. $52.95. Model Aircraft Co., 694 Shadow Wood La., Webster, N.Y. 14580.



HAND CRAFTED MODELS/MESSERSCHMITT BG-109E—A striking sports scale kit features all balsa construction and a semi-symmetrical airfoil for non-critical flying enjoyment. For four-channel systems the ship has a 66-in. wingspan and is for a 60 engine. Parts are handcrafted and individually fitted and packaged. All necessary hardware is included in the $75 kit. Hand Crafted Models, P.O. Box 7073, Amarillo, Tex. 79109. Kits are distributed exclusively through Randolph Hobby Distributors.

J & J INDUSTRIES/TROUBLEMAKER—Tony Bonetti's pattern ship, the *Troublemaker*, is being kitted by J & J in their usual all-balsa form. Included are all pre-cut balsa parts, complete hardware package and 3D blueline drawings with retract installation shown. Fifty-eight-in. wingspan ship is for 60 engines. $59.95. J & J Industries, P.O. Box 202, Oakhurst, N.J. 07755.

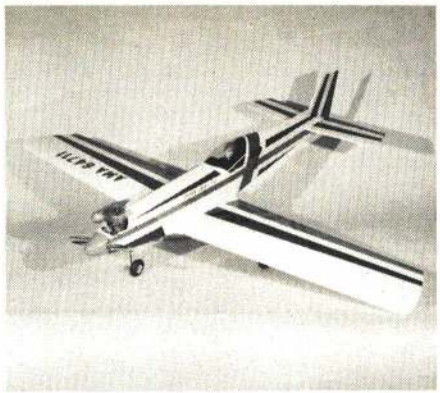
WIK MODELS/SUPER CUB—This 40 sized full-scale model of the Piper Super Cub features a fiberglass fuselage, cowl with a built-up wing. Model has a 60-in. span and features excellent scale cabin window strut detail. $74.95. Midwest Model Supply Co., 6929 West 59th St., Chicago, Ill. 60638.



HOUSE OF BALSA/SHOESTRING—Fred Reese's winning *Shoestring* is kitted by House of Balsa and features a fiberglass spar wing and all balsa construction. The kit includes a formed canopy, fiberglass cowl, plans in three-views. The plane is designed for 15 RC engines. Wing has a 10% thickness, 302 sq. in. of area and is for four-channel radio. $32.95. House of Balsa, 2814 East 56th Way, Long Beach, Calif. 90805.

HOBBY SHACK/CITABRIA—A semi-scale version of the fully aerobatic champion *Citabria*, this 43-in. span sportster is a great flyer for beginners and pros alike with an 051 engine to 15. The airplane will accept one- to three-channel radio and is an all balsa kit. $12.99. Hobby Shack, 6475 Knott Ave., Buena Park, Calif. 90620.

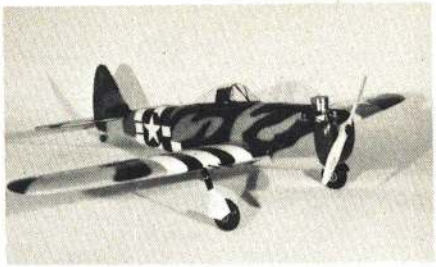
R/C KITS/U-2—A stand-off scale version of the famous Lockheed airplane *U-2*, this plane features very docile flying characteristics due to a symmetrical center section and semi-symmetrical tip section. Plane has a 70-in. span with 790 sq. in. of area and is for 45 to 60 engines. The kit features an all balsa fuselage with foam wings and stab. Two kits are available. The standard unsheeted kit for $49.95 and the sheeted deluxe kit for $69.95. R/C Kits, 353 Briar Ave., North Canton, Ohio 44720.



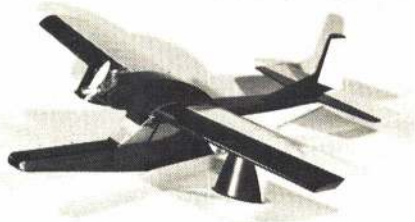
JOHNNY CASBURN/SUPER LUCKY FLY—This contest ship is designed to fly a very smooth aerobatic pattern. Ship has a tapered wing constructed of polished vinyl-covered foam and a balsa fuselage requiring a minimum gluing of pieces. Aircraft can be built quickly and is for 45 to 60 engines. Sixty-two-in. wingspan, 651 sq. in. of area. $56. Johnny Casburn Manufacturing Co., 5821 East Rosedale, Ft. Worth, Tex. 76112.

HEGI/T-45—This high-performance, prefabricated kit is a steady performer with a 40 engine, yet with a 60 becomes a real stunter. The ship has a 51-in. wingspan and weighs approximately six lb. Balsa fuselage, covered foam wings. Aristo Craft Distinctive Miniatures, 314 Fifth Ave., New York, N.Y. 10001.

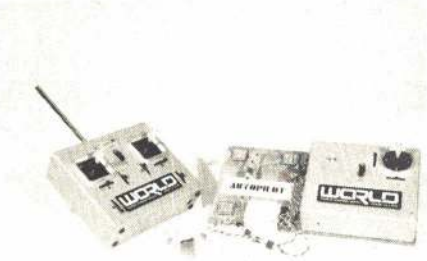
TIDEWATER HOBBY/SQUARE SHOOTER—Dave Robelen's Sunday Flyer Ship is versatile in that it is aerobatic yet docile. Kit has a short assembly time of six to eight hours and is constructed of balsa, plywood, spruce throughout. Complete hardware pack with fittings, linkages, and pushrod materials included. $29.95. Tidewater Hobby Enterprises, 103 Bannister Dr., Hampton, Va. 23366.



LONG ISLAND HOBBYCRAFTS/P-47—This all-balsa and plywood ship is a World War II stand-off scale Thunderbolt P-47 designed by Nick Ziroli. Kits go together quickly and the complete hardware package is included. For 40 to 60 size engine. Wingspan is 53 in. $50. Long Island Hobbycrafts, Inc., 7800 Shorefront Parkway, Rockaway Beach, N.Y. 11693.



GEE BEE/MALLARD—This "triphibius" (water, land, snow) plane utilizes a finished polyethelene hull which is extremely rugged. Plane has experience-designed tip floats that eliminate cartwheeling and submerged tips during crosswind taxiing. 50-in. span plane uses a 19 to 25 and weighs approximately 3¾ lb. $39.95. The Gee Bee Line, 143 East Main St., Chicopee, Mass. 01020.



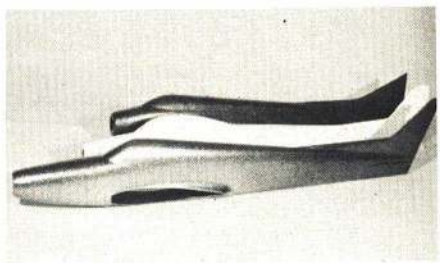
WORLD ENGINES/SERIES TWO EXPERT AND AUTOPILOT—This new Expert Series with the "World" nameplate has a new bale-type stick assembly and is essentially the same as the old Expert series with the elimination of roll buttons and buddy-box feature. The autopilot is Maynard Hill's design—a three-sensor, two-axis system which will operate on almost any radio control set. Autopilot will probably sell for between $80 and $100 fully assembled. Eight-channel World Expert Series two-stick with 4 S-5 servos is $440. World Engines, 8960 Rossash Ave., Cincinnati, Ohio 45236.

TENCO INTERNATIONAL/WAYFARER—This high-performance bipe has a wingspan of 52 in. and is in an all-balsa kit form. The Svenson kit weighs 5 to 5½ lb. with radio gear and is for 40 to 60 engines. The kit includes wheels, Hallco gear, tank, bellcranks, etc. $64.95. Tenco International, 301 Tamarisk Rd., Palm Springs, Calif. 92262.

RADIOS

R/C MANUFACTURING/SERIES 800XL—Incorporated in a new four-channel system is the "hand-tenna" shown as standard equipment. The new feature doubles as an antenna as well as a handle with which to carry the transmitter. $410. Also available with five or six channels. R/C Manufacturing, 7717 Fair Oaks Blvd., Carmichael, Calif. 95608.

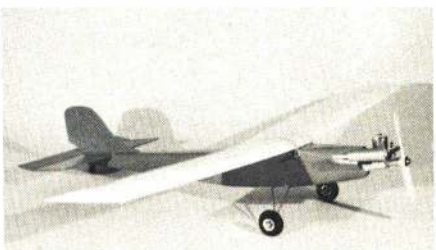
HEATHKIT/THREE-CHANNEL SYSTEM—This all new system features a slim-line single stick transmitter which is comfortable and easy to hold. With the three-channel system, two-axis stick is used with a motor control on the side. Three channel with two large capacitor servos—$139.95. Conversion kit for TX and RX—$19.95. Four-channel system with three-axis transmitter stick and two small IC servos $169.95. Heath Co., Benton Harbor, Mich. 49022.



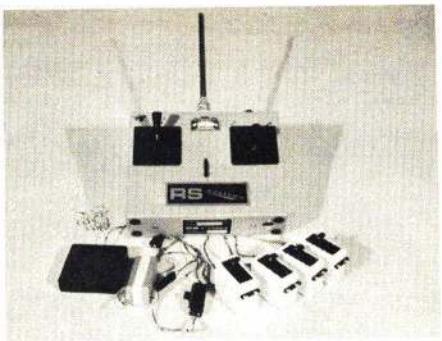
HOBBY WORLD/40-SIZE FUSELAGE—Shown are a new series of 40-sized airplanes which are basically reductions of the full-sized *Cutlass, A-6 Intruder,* and *Phoenix 5.* The fuselages come with foam wing and stab with integral fin built into the fuselages. All are designed for tricycle gear and 40 size engines. $42.50 each. Hobby World, 6602 Highway 100, Nashville, Tenn. 37205.

PROLINE ELECTRONCIS/PL-4-0 SYSTEM—Popular Proline series has new plug-in mini circuit boards, dual AGC receiver, printed circuit boards in battery packs as well as new PLS 14 and PLS 15 servo mechanics. Proline has a new optional battery tester to determine condition of airborne battery pack, $19.95. Two-stick open gimble four channel, $429.95, six channel, $479.95, with four servos. Proline Electronics, Inc., 10632 North 21st Ave., Phoenix, Ariz. 85011.

ROYAL ELECTRONICS/CLASSIC SERIES—Shown is the eight-channel Royal Classic transmitter utilizing the new Acutrol sticks and a new high-powered 10 volt battery. IC receiver and a choice of six different servo mechanics are available. Royal Electronics, 2119 South Hudson St., Denver, Colo. 80222.



WK HOBBIES/SUPER FLY—New kit comes with fiberglass fuse and has covered wings and all-balsa parts cut and hinged. Hardware is included (motor mount, landing gear, wheels, etc.) All that is needed is paint, radio, and a motor. Quick building. No price is available. WK Hobbies, 19 North Main St., Centerville, Ohio 45459.

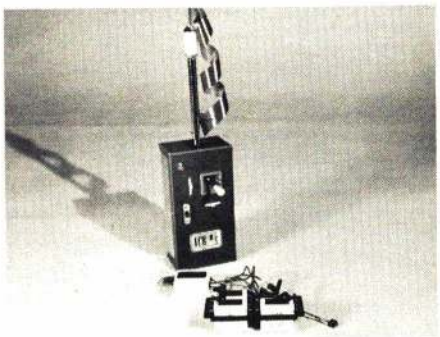


RS SYSTEMS/SIX-CHANNEL SYSTEM—This new system features the D&R open gimbal stick assemblies and a very small, light receiver. The system also includes buddy-box system, centilock pins, external charger, switch guard on transmitter and D&R servo mechanics. Trim functions can be "crossed" on the open gimbal models at additional cost. $469.95. RS Systems, 2407 South Broadway, Santa Ana, Calif. 92707.

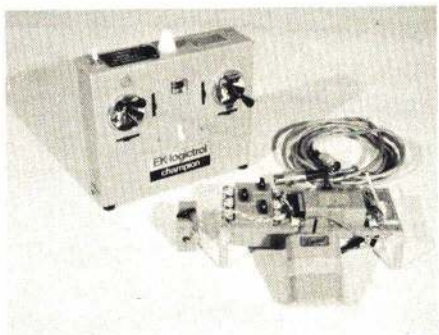
ORBIT/TRANSMITTER MOUNT—Jane Blitch displays this European style transmitter holder which is fabricated in metal flake fiberglass. Unit has adjustable straps for comfortable use. Adaptable to fit most modern transmitters. The first American version of an accessory widely used in Europe. $29.95. Orbit Electronics, 1641 Kaiser Ave., Santa Ana, Calif. 92705.

KRAFT/SERIES 73—Now Kraft offers a seventh channel in their system at no added cost and a lower powered integrated circuit decoder which increases reliability. Transmitters are now available with an open gimble stick. Three new styles of servos are available KPS 14, 15, and 16—all of which have reinforced mounting ears and a new set of gears. The KPS 16 uses a higher gear reduction version producing 18 lb. of thrust which makes this servo ideal for use with auxiliary controls such as retracts, flaps, boat or car steering linkages. Kraft Systems, Inc., 450 W. California Ave., Vista, Calif. 92083.

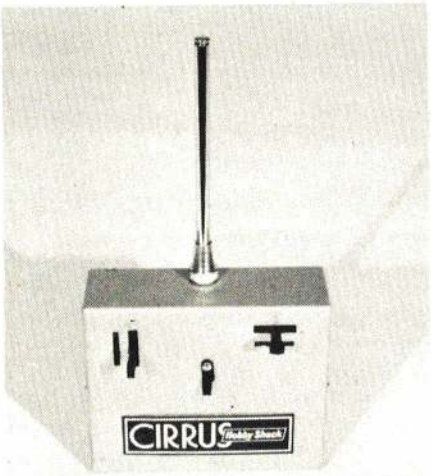
CITIZEN-SHIP/NEW SYSTEM—Totally redesigned system features new molded Tx case, meters which show actual condition of batteries, and retractable Tx antennas which operate the on-off switch. Choice of four servo sizes. Six-channel, two-stick, $449.95; single-stick, $459.95. Citizen-Ship Radio, P.O. Box 297, Westfield, Ind. 46074.



ACE/R/C DIGIPOD—Shown incorporated into Ace's regular two-channel digital system is the Digipod servo, an optional accessory item. The Digipod system is a pulse-emission detector which will operate in three different positions by command of a pushbutton on the transmitter. Price of the Digipod servo is $29.70 and the transmitter mechanics are a $1.75. Total price of three-channel system shown above is $130.60. Digipod servo is adaptable to many other makes of digital two-channel systems. Ace R/C, Inc., 203 West 19th St., Higginsville, Mo. 64037.

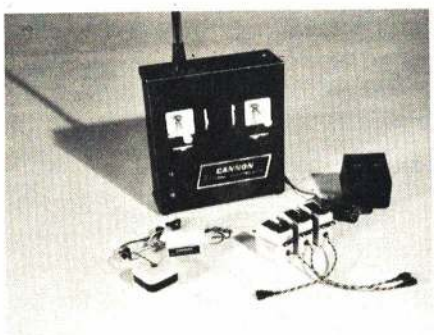


EK-LOGICTROL/CHAMPION SERIES—This six-control set has a 10 oz. airborne weight and offers a choice of linear or rotary servos. The system has a 90-day unconditional guarantee and for the remainder of the year has a maximum charge of $25 to $35 for repairs of any type of damage, including crash. The Champion Series uses a new buddy-box and they have incorporated a new shaped battery into the system. Price is $349.95 for two stick, $369.95 for single stick. EK-Logictrol, 3233 West Euless Blvd., Hurst, Tex. 76053.



HOBBY SHACK/CIRRUS TWO CHANNEL—This system has two separate servos and IC servo amplifier and decoder chips and features a full 90-day warranty. Airborne pack weight—7½ ounces. $69.95. .250 amp NiCad pack available—$19.99 extra. Hobby Shack, 6475 Knott Ave., Buena Park, Calif. 90620.

SONIC SYSTEMS/RETRACT SERVO—Auxiliary servo for retracts and other functions does not require an extra channel. Can be operated with a dual plug and cycled by pushing the buddy-box button on transmitter. Two models are available to fit all different manufacturers' systems. $35. Sonic Systems, P.O. Box 192, Whippany, N.J. 07981.

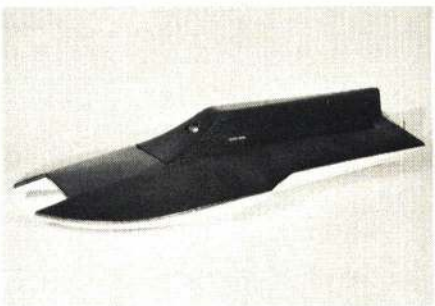


CANNON ELECTRONICS/SUPER-FLITE—Low-cost four-channel system uses IC receiver, decoder, and servo amplifier and all nickel cadmium batteries. Includes four Cannon E-1 servos, small receiver and a choice of three battery packs. 9.8 oz. airborne weight. $249.95. Three- and five-channel systems available in this series. Cannon Electronics,

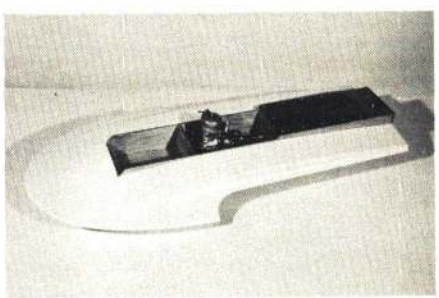
13400-26 Saticoy St., North Hollywood, Calif. 91605.

MRC/MASTERS MARK VIII—Eight-channel system has fourteen ICs for reliability, miniature three wire servos, 500 mah NiCad airborne pack, double-tuned RF preselector and separate charger. Set features a full one-year guarantee. $399.95. Model Rectifier Corp., 2500 Woodbridge Ave., Edison, N.J. 08817.

BOATS

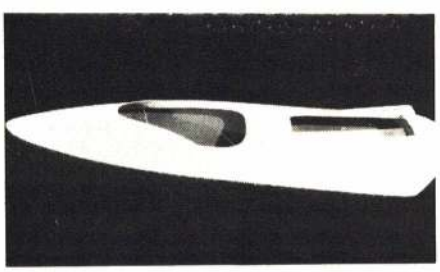


EKIM/XV-E—This top-of-the-line speed boat has an all fiberglass hull with color and metal flake molded in. Forty-in. length boat is for high-powered 60s to O & R engines. Many other hydros and model hulls available as well as marine hardware (not included) in kits). $89.95. EKIM, P.O. Box 144, Palmetto, Fla. 33561.



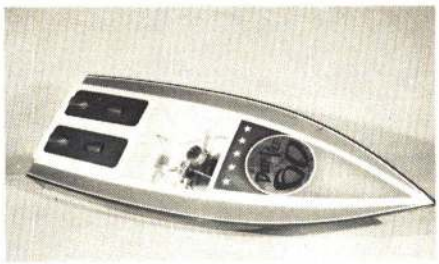
HUGHEY BOATS/TWO HYDROS—Two hydro kits are available from Hughey Boats in 19 and 40 size. Kits consist of a rigid urethane foam hull plus all necessary wood and metal hardware (shaft propeller, rudder, fin, flywheel, control arm, etc.) $60 and $65. Hughey Boats, 840 East 64th St., Indianapolis, Ind. 46220.

STERLING MODELS, INC./THREE SCALE KITS—These 11-in. long sailing ships are complete with precarved wood hulls, cloth sails and cast metal fittings. The three versions available are the *Constitution*, *Spanish Galleon* and the *Bluenose Schooner*. Rigging installation and ratlines have been simplified for easy construction, $6.95. Sterling Models, Inc., Belfield Ave. and Wister St., Philadelphia, Penn. 19144.

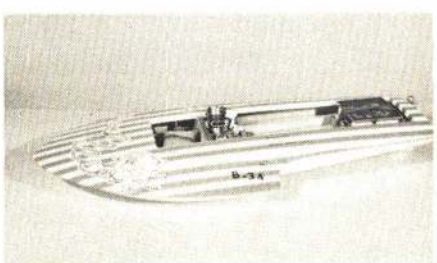


XL-ENT/SATURN MAJOR—A flattie type hull in fiberglass features fully swept integral spray strips, radius stern for improved steering. *Saturn Major* is 31-in. long for 60 engine, $49.95. *Saturn Minor* is 26-in. long, 29 cu. in., $44.95. *Saturn Mini*, 24-in. long, 19 engine, $39.95. XL-ent Products, 49 Ryder Ave., Patchogue, N.Y. 11772.

HARTMAN FIBERGLASS/HARBOR TUG KIT—This huge 44-in. long fiberglass kit comes complete with hull deck complete wood super structure, plans and many options. Fantastic scale effect. $135.00. Hartman Fiberglass R/C, Argenta, Ill. 62501.

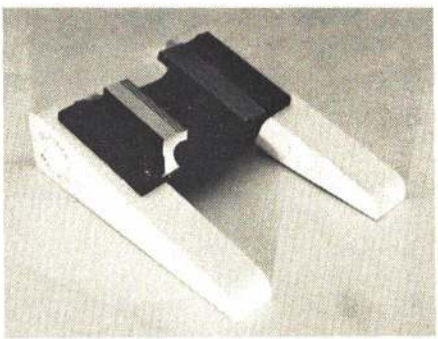


DUMAS/DEEP VEE AND COAST GUARD—*Deep Vee 60* is a beautiful offshore racer for rough water racing. Boat has a 38-in. length with a 14-in. beam for a 40, 60 or a larger engine if desired. Boat is quite large so has plenty room for engine, radio and fuel. Features typical die-cut poplar plywood framework with birch plywood bottoms, sides and deck. Scale model of the Coast Guard 44-ft. lifeboat is for RC electric power. Kit has 1/8 x 1/2 in. balsa planking and includes all deck hardware. Length is 33 in. beam is nine in. *Deep Vee 60*, $39.95, *Coast Guard* $33.95. Dumas Products, Inc., 790 South Ave., Tucson, Ariz. 85719.



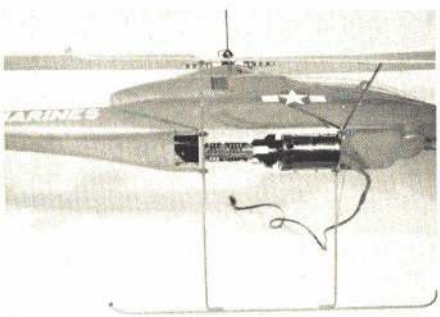
G.E.M. MODELS/WHIRL WIND—This B Hydro driven by Gary Preussee was the first of its class to go over 50 mph. Boat has a 27 in. length for 19 engines, fiberglass hull, $35. G.E.M. Models, P.O. Box 342, Broadview, Ill. 60153.

FIBO CRAFT/"FISHING SKIFF"—This 26-in. long skiff in a molded fiberglass hull is available in green, white, black, blue or orange. For electric motors or gas engines up to 15. The kit has precut cabin and cockpit parts plus all detailed fittings. Fibo Craft Models, P.O. Box P-489, Bay Shore, N.Y. 11706.



OCTURA/NEW ACCESSORY—Designed for 19 through 40 engines this black anodized engine mount has tilted engine pads to allow the exhaust stack to clear at the edge of the hull. Mount is four-in. wide, 2-1/8 in. long and is interchangeable with Octura 30 and 440 mounts. $4.25. Octura Models, P.O. Box 536, Parkridge, Ill. 60068.

HELICOPTERS

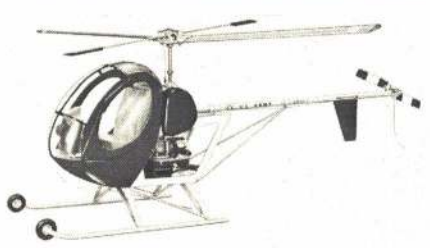


TOWER HOBBIES/ELECTRIC POWER—The new concept in helicopter flying, this motor is for electric-powered Bell *Huey Cobra* helicopters powered by a 1/5 horsepower electric motor. The helicopter can be flown in one's basement or backyard without disturbing anyone. All that is needed is an electrical outlet and an extension cord as long as the flight area permits. Prices undetermined. Tower Hobbies, P.O. Box 2874, Champaign, Ill. 61820.

GRAUPNER/BELL TWIN JET—This fiberglass fuselage kit is a scale replica of the Bell 212 Twin-Jet helicopter and utilizes coupled collective pitch and throttle. One of the best flying helicopters seen to date. Copter has a single reduction between engine and motor shaft. Kit has high-quality precision fittings and includes an H.B. .60 engine. Uses standard four-channel radio. $500. Johannes Graupner, Associated Hobby Manufacturers, 621 East Cayuga St., Philadelphia, Penn. 19120.

HEGI/ENSTROM F-28A—Dieter Schluter's design, this chopper is "easy to build" and includes a complete mechanical kit which is like that used in Hegi *Bell Huey Cobra*. This model has motor cooling fan, coupling and transmission mounted on one plate for easy accessibility. Aristo Kraft Distinctive Miniatures, 314 Fifth Ave., New York, N.Y. 10001.

TOWER HOBBIES/DU-BRO CONVERSION—This adapter package allows the modeler to run his Du-Bro Whirlybird 505 with a Northfield Ross 60 twin. This engine will provide greater stability due to torque and give a large amount of reserve power to the flier. All necessary hardware included, $49.95. Tower Hobbies, P.O. Box 2874, Champaign, Ill. 61820.

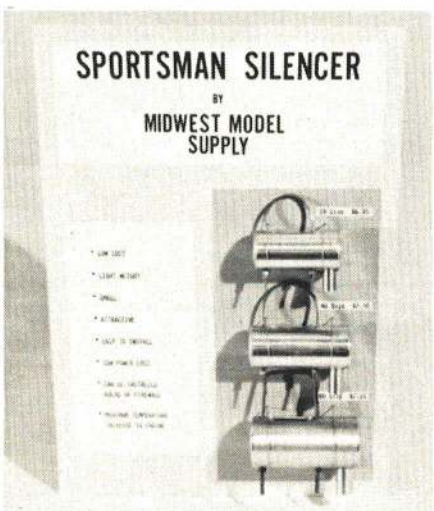


DU-BRO/HUGHES 300—Semi-scale version of the Hughes 300, this helicopter comes complete with an O & R 1.2 cu. in. glow fuel engine, gear box, and inertia clutch. All that is required for completion of the unit is radio equipment, wheels, and a fuel tank. Helicopter has a flying weight of approximately 14 lb. and is one of the more maneuverable copters available. Kit is extremely simple to build and is constructed of high quality materials. $350. Du-Bro Products, Inc., 480 Bonner Rd., Wauconda, Ill. 60084.

CUSTOM FIBERGLASS/JET RANGER BODY—Shown here with Dieter Schluter mechanics, this body sells for $89.95 with landing gear and aluminum tubes. Manufacturer will do custom fiberglass work by making plugs and molds to suit your needs. Custom Fiberglass Fabrications, 19 Timber La., Levittown, Penn. 19054.

ARISTO-CRAFT/BELL JET RANGER—This Kalt kit includes a pre-finished (unpainted) fiberglass fuse, and incorporates all Schluter controls. Gear box is assembled and fully enclosed. Main rotor diameter 55 in., flying weight 9½ lb. for 60 engine. $399.95. Aristo-Craft Distinctive Miniatures, 314 Fifth Ave., New York, N.Y. 10001.

ENGINES

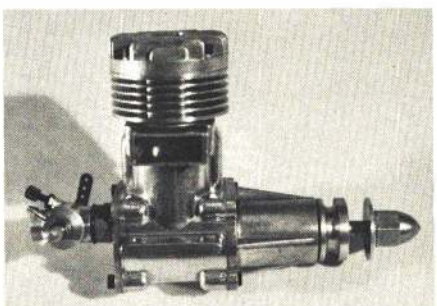


MIDWEST MODEL SUPPLY/SPORTMAN'S SILENCER—This attractive lightweight muffler can be installed ahead of the firewall in an airplane and is designed for low-power loss and minimum temperature increase in the en-

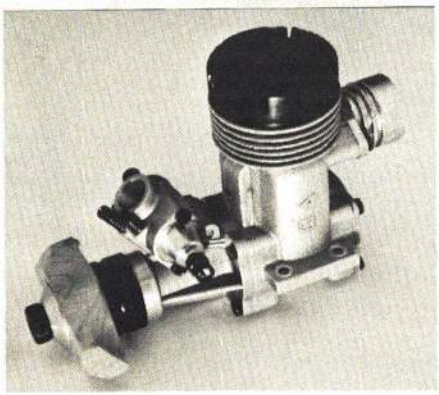
gine. Three different sizes of this lightweight muffler are available. 19, 40, and 60 sizes for $6.95, $7.50 and $7.95 respectively. Midwest Model Supply Co., 6929 West 59th St., Chicago, Ill. 60638.

SEMCO/SUPER MUFFLER—Designed for competition and discriminating Sunday fliers, this muffler is available only for large size engines (45 to 80). Muffler has a pressure fitting and a black anodized and polished aluminum finish; features an improved Venturi design, larger expansion chamber and exhaust areas. Uses Semco adapters and extensions. $12.95. Semco Model Engineering Co., 113 Graniteville Rd., Chelmsford, Mass. 01824.

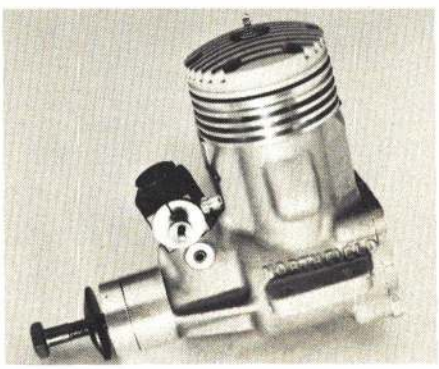
MRC-WEBRA/SPEED 61—Produced in Austria, this new MRC Webra 61 is available in two versions in rear rotor and front rotor with 1.7 horsepower and 1.5 horsepower respectively. The engines use Schneurle porting and have flat-top pistons and deep fins on the cylinder to provide high heat dissipation and distribution. Prices to be announced. Model Rectifier Corp., 2500 Woodbridge Ave., Edison, N.J. 08817.



NELSON MODEL PRODUCTS/HP ENGINES—Shown is the HP 61 RR-RC in the latest version of all the HP engines having a polished cylinder head, fins, and engines casings. Four HP engines are available, a front and rear rotor 40, and front and rear rotor 60s. Engines come with mufflers; prices are to be announced. Nelson Model Products, 6929 West 59th St., Chicago, Ill. 60638.

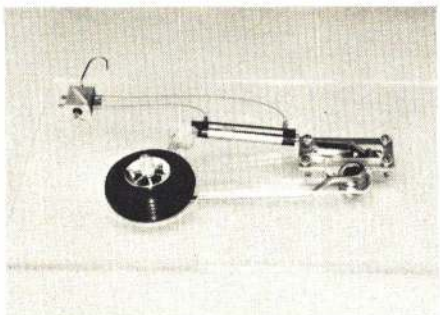


OPS/PROJECT 40—These new speed engines are scaled-down versions of the OPS Speed 60 Red 73 engine. The only difference between the two engines is in the rear valve which, because of the reduced dimensions, no longer operates on a laminated steel disc system. Engines are available with side or rear exhaust with front or rear intake for boats, cars, airplane speed competition. Fifteen different versions of the 40 are available. Shamrock Competition Imports, P.O. Box 26247, New Orleans, La. 70126.

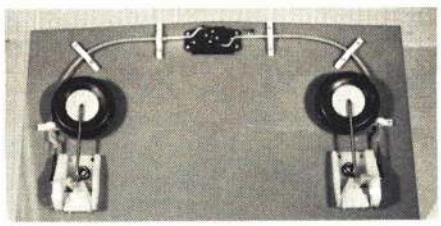


NORTHFIELD ROSS/SINGLE CYLINDER 60—Pre-production units of this new engine are turning 11-7 props at over 13,000 rpm making this unit one of the more powerful 60s available. Engine features typical Ross quality workmanship and is designed for long life and high power. Available summer of '73. $95. Northfield Precision Instrument Corp., 4400 Austin Blvd., Island Park, N.Y. 11558.

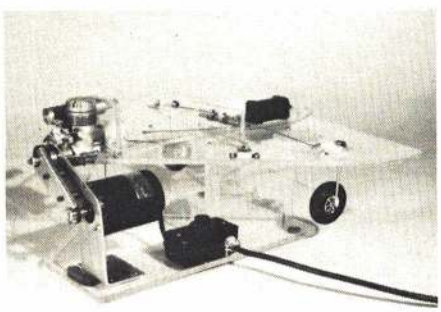
RETRACTS



SONIC SYSTEMS/TORSIONAIRE—This retract gear set has a very low profile of 3/4 in. and uses a torsion bar system to absorb shock in place of coiled struts, thus resulting in a much cleaner looking system. Retracts have a dual lock system and are priced at $19.95 for mains, or $14.95 for the coiled strut style. Gears have nylon bearings and all steel construction and weigh three oz. each. No nose gear available. Sonic Systems, P.O. Box 192, Whippany, N.J. 07891.

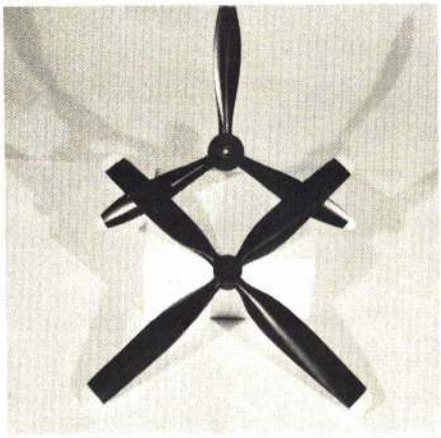


DTD/P-40 GEAR—These retracts are designed with the P-40 style of retraction with the wheel turning 90 degrees and folding up into the wing as shown in the picture. Gears are made from precisioned machined, stress relieved polypropelene. Weight of three gears is 11½ oz. complete, and gears require only 1½ in. total depth. Set of three gears, $69.95. DTD Co., 409 Burlington Ave., Delanco, N.J. 08075.



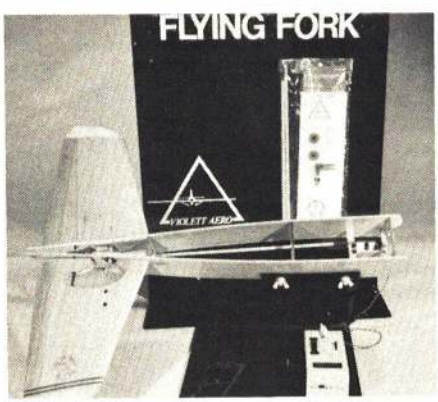
BURCO MOLDING, INC./FAILSAFE RETRACTS—The newest idea in retract systems, this system uses crankcase pressure produced by the engine (35 to 60) and channels the pressure into a pneumatic servo and valve to provide the power to actuate your retracts. Total weight of the pneumatic servo and valve is only 2.8 oz. and one servo will operate three gears off of a four-channel radio. When the motor quits, the gears automatically cycle to the down position. Servo and installation kit, $29.95; optional nose wheel servo, $12.25. Available from Indy R/C Sales, 10538 Jessup Blvd., Indianapolis, Ind. 46280.

ACCESSORIES

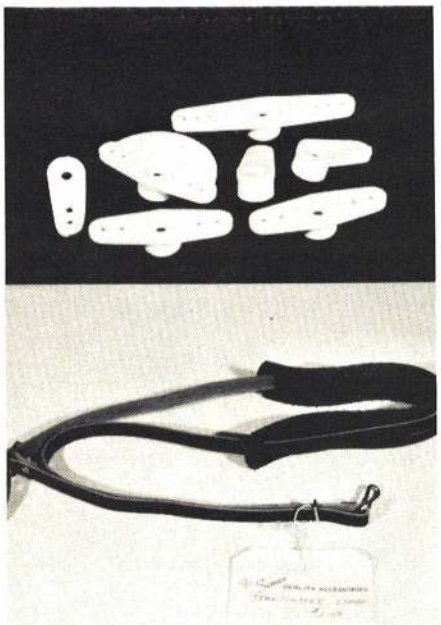


WOODCRAFT/SCALE PROPS—These non-flying scale props are especially designed for P-51 or P-40 style airplanes in a two inch scale. Three and four blade styles. Kit price, $11.95. Finished, $15.95. Midwest Model Supply Co., 6929 West 59th St., Chicago, Ill. 60638.

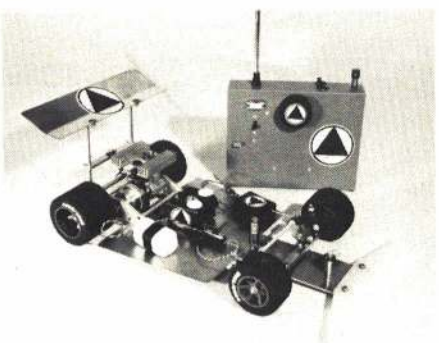
CARL GOLDBERG/DJ MULTISTRIPE—This new pressure sensitive adhesive tape is designed for striping paint schemes on model airplane finishes. The tape is available in five colors and four sizes ranging from 1/16 in. to 1/4 in. Once applied, the tape bonds permanently to the finish—will not fade or crack. Highly conformable, will follow any contour. 36 ft. length—prices range from $1.98 to $3.69. Carl Goldberg Models, 2541 West Cermak, Chicago, Ill. 60608.



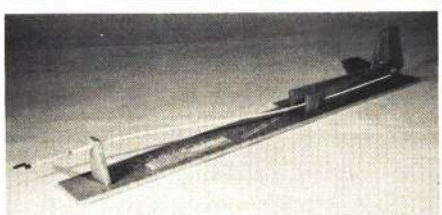
VIOLETT AERO/FLYING FORK—This mechanism is designed as the mechanics with which to create a full-flying stabilizer with minimum linkage play and maximum performance. Unit was designed for use with power planes, gliders, or canard configuration planes. Package consists of fork itself, thrust tube, pivot tube, and bearings. Price is $4.95. Violett Areo, 9176 Red Branch Rd., Columbia, Md. 21045.



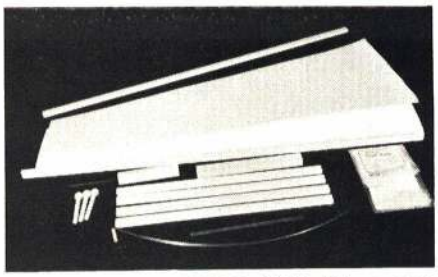
SEMCO/SERVO CONTROL ARMS AND TX STRAP—An assortment of servo arms fitting all types of servos with Kraft-type mechanics. An assortment of six, $1.49. The transmitter strap is designed for contest or sport flier to hold his transmitter safe and secure. Leather strap complete with hook—$2.69. Semco Model Engineering, Inc., 113 Graniteville Rd., Chelmsford, Mass. 01824.



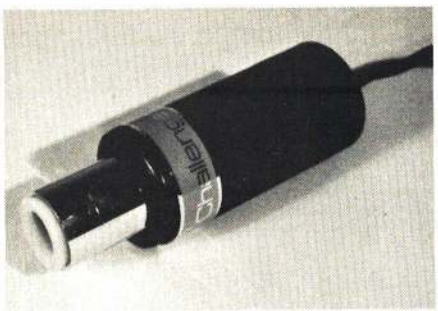
DELTA/CAR AND RADIO—This racing car has a rod-pod type chassis with a flex pan and has molded steering blocks and brake assembly. No body is included in this super-rugged car. Approximately $100. Optional wing kit. Two-channel radio uses dry cells in transmitter, NiCads in car and has super strong and fast (3/10 sec. transit) servos. Transmitter uses steering wheel for steering and has a grip in the rear of transmitter for brake and throttle. Interchangeable crystals. $280. Delta Systems, Box 754, Bridgeton, Mo. 63044.



SU-PR-LINE/PUSHROD SYSTEM—The new Su-Pr-Rod is a 44-in. pushrod with smooth surfaces so that no oil or dirt are accumulated inside the pushrod. Rod bends to a 3½-in. radius and is not affected by heat or cold. All hardware included. $1.49. Su-Pr-Line Products, Plainfield, Ill. 60544.



WING CENTRAL/WING KITS—These complete wing kits are designed around a precision cut core and include balsa leading and trailing edges, wing skins, hinges, hold-down bolts, reinforcement tape, ailerons, and trunnion box. Wing kits are available for many different popular style airplanes and special wings are available upon request. Wings retail for $7.95 to $12.50 depending on size. Wing Central, Box 33, Crystal Lake, Ill. 60014.



SONIC TRONICS/CHALLENGER II—While similar to the original *Challenger* in appearance, this starter has undergone internal changes with a new motor with more powerful magnets providing additional torque. The starter also runs smoother than the previous model and again has the two-year written guarantee. $35.95. Sonic Tronics, 2 South Pennsylvania Ave., Philadelphia, Penn. 19111.

SOUTHERN R/C/SIX-SHOOTER—This hand-operated fuel pump has a rugged design with no seals or valves to leak or wear out. The pump is self-priming and puts forth 6/10 oz. per turn. Flow can be reversed almost instantly and is guaranteed for one year. $9.95. Southern R/C Products, Inc., 8685 North Palafox Highway, Pensacola, Fla. 32504.

(Continued on page 100)

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ON THE SCENE

(Continued from page 14)

One-hour model is like many antique rubber designs. It was made with hot-melt glue! Twin pushers do eliminate torque.

museum in San Marcos, California for a pre-grand opening tour. This was certainly a treat for any dedicated modeler, as it is as close to paradise as any scale modeler is likely to get! All contestants went away laden with priceless copies of rare three-views, plans, and fond memories of the experience. Russ has offered to host another such race, and it was unanimously agreed that the meet should be made an annual event.

Postscript: For modelers who are contemplating Rubber Scale, may I make the following suggestions gleaned from conversations with the contestants and personal experience. Keep it light and strong. This may sound contradictory, but can be accomplished by building strong where it counts. A model with a long nose moment will save you from having to add nose weight.

Use spruce for stressed spars and leading edge. Sheeted wings can be light and strong if you use the lightest 1/16" or 1/32" balsa sheet you can find. A wooden prop will break often, and either a plastic one or a system for easy blade replacement is recommended. Don't use a high-lift endurance-type airfoil section. At speed you will be getting much more lift than you can handle. Go symmetrical, low drag type. In the old days, the really fast models nosed in like bricks when the power was expended. If you just have to have a glide, make an auto elevator designed to increase the negative incidence in your stab when the rubber pressure eases off the rear motor peg.

CURTISS R3C

(Continued from page 52)

From then on, the Schneider was a race for monoplanes, especially those from the gifted brain of R. J. Mitchell. His Supermarine S-5 won in 1927 at 282 mph, his S-6 in 1929 at 329 mph, and his S-6B in 1931 at 340 mph. Biplanes were completely out of the running.

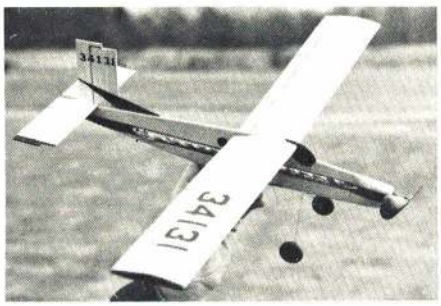
And so was the Schneider Trophy, which was retired to the Royal Aero Club in London, having been won three times in a row by Great Britain. It can still be seen there, in a place of honor. The great advances in speed forced by the prestige-laden races were, in many

cases, all but forgotten. Italy and the United States, two of the three countries which invested heavily, entered World War II with second-rate fighter planes, having let their advantages slip down the drain. The British, much to the relief of the western world, took the Rolls Royce Buzzard racing engine and turned it into the Merlin, which powered more Allied fighters and bombers than any other. And they took the beautiful but impractical Supermarine racers and came up with the beautiful and imminently practical Spitfire.

All because somebody had the funny idea that seaplanes could be fast.

PROFILE PORTER

(Continued from page 56)



Alignment is always important to good flying. Handy objects support wing, tail, and fuselage while glue dries.

Although construction can begin with any part of the model, we suggest you start with the simple flat surfaces of 1/32 balsa sheet that form the horizontal and vertical tails. Both the horizontal tail (commonly called the stabilizer or elevator) and the vertical tail (the fin or rudder) can be traced directly from the plans by using carbon paper, or you can measure the full-size plans and redraw the outlines of the surfaces right on the balsa. Cut along the outlines drawn or traced on the balsa, and you have the finished tail surfaces (except for trim details).

The wing is a bit more difficult. First, cut the large rectangular wing skins from 1/32 balsa sheet in a manner similar to that used for the tail surfaces. Lightly, in pencil, indicate the proper location of the wing ribs on the wing skins as shown on the plans. Next, cut six wing ribs from 1/16 sheet balsa, using the drawing of the wing cross section on the plans for your pattern. All six ribs should be identical—sand them to shape as necessary to make sure they match. Now glue a strip of 1/16 square balsa along one edge of each wing to provide extra stiffness and strength to the wing, and to help you form a rounded leading edge after completing the wing construction.

Lay both wing halves down on a flat surface (the side with the 1/16 balsa strip, which is actually the underside of the wing, should be facing up). Carefully glue the ribs in place by applying glue only to the forward end of the ribs and a small distance (about a ¼") along their upper (curved) edge. When doing this the ribs should be placed tightly against the leading edge strip; their aft

end will project up away from the sheet skin due to their curved upper edge. By very lightly dampening (try using a sponge) the upper surface of the wing skins, you will be able to easily warp the skins to the shape of the ribs and thus glue the skins to the upper, curved, edge of the ribs. This will complete construction of the two wing halves.

The fuselage is built by first tracing its outline onto 1/8" sheet balsa. After cutting the outline shape, cut the slot in the fuselage to accommodate the rubber motor. The front end of the body must be built up to receive the hardwood nose button which mounts the wire prop shaft. The build-up is accomplished by gluing a small piece of 3/16" balsa sheet to each side of the forward end of the body and, finally, gluing a small piece of 1/8" sheet balsa against the front end of the nose.

The built-up front area can now be carved to shape as shown on the plans by tapering the 3/16" sheet back to fair into the 1/8" fuselage and by rounding off all the edges to form a smooth looking front end. A hole through the front end to provide a snug fit for the nose button completes the fuselage.

Although a balsa prop can be carved, it is not necessary for a simple model such as this. A plain five-in. plastic prop, bought in the local hobby shop, was used on the original Profile Porter. It gave perfectly satisfactory performance and is much simpler for the model builder. The prop shaft is formed from 1/32" music wire and makes a complete unit of the prop and nose button. Just be sure to use a small glass bead or a couple of small washers between the button and the prop to assure a smooth, easy turning, propeller.

The dummy exhaust stack can be added to the fuselage if an additional touch of realism is desired. It is not required, however, for a model to fly well.

The main landing gear and tail-wheel "struts" are bent from wire to the shape of the full-size patterns shown on the plans. Note that the .025" main landing gear wire actually passes through the fuselage, so that installation of the wheels must be done after it is pressed through the body. Bond the ends of the forward and aft main gear braces to the main gear with light thread, or light copper wire, and glue. Then, using simple "U" hooks bent from straight pins, attach the gear braces to the fuselage bottom edge. The tail-wheel assembly is made by simply gluing a balsa disk to a wire strut bent as shown on the plans. The assembly is then glued to the aft end of the fuselage.

Now that you've completed the major components of your model, proceed to assemble them. Alignment is the critical factor here, particularly in the fore-and-aft view. Be sure to install the proper amount of dihedral in the wing, and be sure that the horizontal and vertical tails are square to each other and to the fuselage. Finally, add the 1/16 x 1/4" wing braces after sanding their edges round.

Our model was given a very light coat of thinned-out clear dope as a finishing touch after all trim and decals

were added. A common straight pin will adequately serve as a rear attachment point (motor post) for your rubber motor. We recommend that you begin your flight trials with an eight-in. loop of 1/8" flat rubber for power, wound between 50 and 100 turns to start.

The Profile Porter can be adjusted to fly either to the right or to the left. While the choice of direction is not important, try to obtain a circular flight path of 25 to 50 ft. in diameter by carefully warping the rudder a little bit at a time until the desired turn is obtained. If your model tends to dive or stall, use a slight warping of the elevator to try to correct the flight path; also check your balance. The model should balance about one in. aft of the wing leading edge. Although our original model balanced perfectly, yours may need the addition of a small amount of clay to the nose or tail to get the proper balance and flight path.

The real key to a good model is patience, practice, and trial and error. Continue trying small adjustments until you obtain the desired results. Also, gradually add additional winds to your motor to get longer and higher flights. After you're satisfied with the way your model is flying, try using a longer loop of rubber in order to pack in more turns and get longer flights. A 12-in. loop of 1/8" rubber will probably give the most satisfying results.

Finally, don't feel restricted to only outdoor flying with your Porter. Although a small park, or even a large clear back yard is all that is needed for an adequate flying field, you can also try flying in any large indoor site such as a school gym or auditorium. Remember, you've got a quiet, clean, model (no noisy, greasy gas engine) that should annoy no one and will, we hope, please you.

AAM COMMANDER

(Continued from page 28)

moved to the decoder. The 1-8 decoder is based on the use of Medium-Scale Transistor-Transistor Logic (MTTL) offering the utmost stability and reliability. The decoder is just about as simple as it can get. There are two ICs, 5 capacitors, two resistors, and one diode to perform the decoding function. The pulse amplifier moved from the receiver adds four components. The decoder is also designed to perform the squaring and pulse stretching functions needed to provide clock and synchronization pulses via an IC, thus reducing the number of discrete components required.

The decoder is shown functionally in the block diagram, Figure 2, and in the schematic, Figure 3. The description which follows is keyed to these two figures. Transistors Q1, R1 and C1 form the final stage of receiver pulse amplification to be done using discrete components. R1 is the load resistor for Q1. C1 provides damping of amplifier self-oscillation. C2 couples the pulse train to the decoder. The number of pulses will always be the number of channels plus one.

The hexagon inverter SN7404 consists of six separate transistors with in-

tegral biasing and loading resistors contained in the chip. Digital information operates between two levels, i.e., it is binary. These voltage levels are usually slightly above zero volts and slightly below 4.8 volts for the decoder. An inverter will show the opposite output from the input.

Let us examine the function of inverter No. 1 in the diagram, as an example. The receiver output is a train of from two (for one channel) to nine (for eight channels) pulses per frame with an upper level of near 4.8 volts. Each pulse drops to near zero volts. The inverters in the SN7404 will switch at these levels, thus the first stage shown inverts and slightly amplifies the pulse train.

The pulse train now proceeds to two separate stages: The one at the top (Inverters 4 and 5) of both the block diagram and schematic generate the "set" pulse and the lower one (Inverters 2 and 3) simply shapes and squares the pulse train to form clock or "shift" pulses.

The shift pulse shaper accepts the pulse train, squares, and stretches it slightly by feeding back via C3.

The output from Inverter No. 2 is negative, but is reinverted by No. 6 to remain positive at the output. The shaped clock pulses are then passed to the eight-bit shift register, the 74L164.

Upon receipt of the first, or "synchronization," pulse, the diode and C4 act as a "sample-and-hold" or pulse

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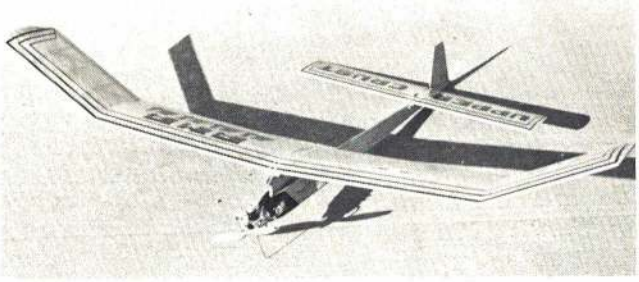

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stretcher. C4 discharges through Inverter No. 4 and places it in an inverted, positive-going state. At this point, the pulse is stretched across the entire pulse train. The output from Inverter No. 4 is still slightly rounded and is of the wrong level, i.e., positive-going for "set" so further stretching is provided by C5. The output from Inverter No. 5 is quite square and is negative-going during the period when the pulse train is present. The shift register is "set" by having the output of Inverter No. 5 be one at the instant the first clock pulse is received. The "set" is immediately driven to ground at the first clock pulse and remains so until after the last pulse is received. In doing so, the first stage of the register, which is a flip-flop, is inhibited from shifting back to Q until the next frame of information is received.

The eight-bit shift register consists of eight R-S (as opposed to J-K) flip-flops. Requirements for the decoding function are as follows: (a) No flip-flop will respond to a clock pulse, i.e., Q becomes a one (positive) unless S is a one at the time the clock pulse is received (CP); (b) If the "clear" line is a zero (negative), none of the registers will shift and any that is a one will be "cleared," i.e., becomes zero; (c) Making SA or SB a one (positive) permits the first flip-flop to clock (i.e., Q1 becomes a one) upon receipt of the first clock pulse.

The simplest flip-flop works as follows: It shifts its binary one (high voltage out) back and forth between Q and Q-bar each time a clock pulse is received. Whenever Q is positive (one), Q-bar is negative (zero) and vice versa. By adding a bit more sophistication, additional control may be added to inhibit the shift or to arbitrarily "clear" the flip-flop by setting it on Q-bar. The two functions we use for control are entered at the "set" input of FF-1 (the S input) and at the clock inputs.

When there is no information present, during the synchronization pause or "set" period, Q for FF-1 through FF-8 is zero. As soon as the first clock pulse is received, FF-1 shifts to Q, i.e., Q becomes positive and, as stated earlier, Q-bar becomes negative. FF-1 cannot shift to Q unless it "sees" a one, or positive level, at SA/SB (pins 1 and 2) which it does at the instant the first clock pulse is received. It then reverts to zero after a delay of a few microseconds.

If S for FF-1 were to remain at the one level at all times, FF-1 would simply shift back and forth between Q and Q-bar every time a clock pulse was received and there would be no decoding. Thus, the "set" pulse was driven to zero an instant after the first pulse was received as mentioned earlier. Now, FF-1 cannot shift again as long as the output from Inverter No. 5 is negative (i.e., not until after all pulses have been received and the output of Inverter No. 5 returns to the one level). This, of course, is why the pause between frames is called the synchronization or "set" pause since FF-1 is "set" to accept the first pulse during this pause.

Go back and reread the preceding two paragraphs and remember that FF-2

cannot shift to Q unless its S sees a one. It sees a one only when Q for FF-1 is a one, i.e., during the first control pulse. So, as soon as Q for FF-1 is a one, FF-2 is set and is free to shift to Q when the second pulse, which also returns FF-1 to Q-bar, is received. FF-2 shifts to Q until the third pulse is received to return it to Q-bar, and so on for the number of channels chosen up to eight. As soon as C4 and C5 have discharged after the last pulse, the output of Inverter No. 5 returns to a one and FF-1 is reset to be ready for the next frame.

The lengths of the control pulses are determined by the length of time (1.5 milliseconds ± 0.5 milliseconds for control motion) between the clock pulses. The synchronization pause is nominally 10 milliseconds, thus the entire frame is 10 + 1.5 + 1.5 milliseconds, or 13 milliseconds. This makes the frame rate about 75 per second for a two-channel set. As the number of channels is increased, the synchronization period may be shortened to around 4 milliseconds and frame rate reduced to around 60 frames per second for an eight-channel set.

The decoder has been tested with just about every servo available that requires a positive control pulse and has been found compatible with all of them. Negative-going servos operating from Q-bar such as the Controlaire S-4a and the EK-MM3 cannot be used, since Q-bar is not accessible. Reread the text on the decoding function of the dual R-S flip-flop and it will be noted that, once the last flip-flop triggered has completed its cycle with the receipt of the final pulse, none of the preceding flip-flops can be shifted again until after a synchronization pause. The decoder can be used with any transmitter whether it is one channel or eight. The decoder simply decodes the first functions from one or eight that arrive. It is held off for extraneous pulses. In general, then, the decoder could be used for any glider, car, boat or plane as a second multi-channel system operating from an existing transmitter.

Construction

Prior to starting construction, review the general construction tips presented in Part I. Using that information, make printed circuit boards for the receiver and decoder from negatives of the printed circuit layout in Figures 4 and 5 and procure the necessary parts. The builder may exercise a wide choice of options for the wiring harness and plugs. Our choice has been to use a "plug-block" arrangement produced by Deans and by D&R or to construct a plug-block from existing Deans connections when converting from two channels. The builder should decide which approach will be used and purchase plugs and wiring accordingly. Lands and holes are provided for individual plugs (one per channel plus power), and for use with four-wire servos.

Construct the receiver in the following sequence. Carefully study the overlay drawing, Figure 6, and all construction notes presented for the original two-channel receiver. The construction and tune-up are precisely the same. The only difference lies in using Figure 6 to place the components on the board. A few components are different from the two-channel. Follow the sequence and construction notes for the receiver presented in Part III.

Before constructing the decoder, decide what the plug and wiring assembly will be. In the interest of conserving space, the builder is requested to review the components list presented with the original receiver and add the components identified in Table 1 by an asterisk. Study the decoder overlay in Figure 7. Proceed with assembly using the following sequence:

(1) Observe the following construction notes. (a) The jumper wire should be made with short lengths of clipped resistor lead. This is installed on the component side of the PC base under the ICs that are installed next. (b) The leads of the ICs are spread somewhat. Simultaneously press the entire row of pins on one side against a flat surface to bend them in slightly. Make sure both ICs are installed with the notch (coded end) in the position shown on overlay. (c) Carefully observe the 1N4148 diode, D1, for location of the banded end and position as shown on the overlay. (d) Observe the polarity of the tantalum capacitors (cylindrical) carefully. The red end is positive (+). (e) The 2N4124 transistor must be mounted as close to the PC base as possible. Make sure it is positioned as shown. (f) The .05 mfd disc capacitor must be mounted as close as possible to the PC base. If there is some insulation on the lead so that the capacitor cannot be mounted close, scrape off clean. (g) Resistors should be mounted flat on the PC base as shown. (h) The Digital Commander servo does not require a center tap. However, a drilled land is provided for use with center tapped servos. (i) The numbers 1 through 8 on the DM8570 or SN74L164, IC-2, are the sequence of the pulse output. When hooking up to the servos, this sequence must be followed. *Note:* Figure 7 shows only one servo signal wire at No. 1. The balance is added as needed.

(2) Install components in the order shown on the overlay, Figure 7. Work slowly and carefully, check continually for possible solder bridges. (3) Cut receiver connection wires to three-in. length, strip 1/8" from ends of each and tin (i.e., melt a little solder on the wires and flip off the excess). (4) Install these wires; leave ends of wires for the receiver free. (5) Use dope thinner or alcohol and scrub all resin from the PC board. Use nail clippers or small diagonal cutters to trim all leads 1/16" from the bottom of the board. Check finished PC board against PC positive for solder bridges. (6) Cable a six in. red and six in. black lead for power by twisting the two together tightly for the full length. (7) Cable the servo or plug block leads—one red, one black, and one other color per servo in each. (If center tap servos are used, a white lead will need to be added to the power and servo cable.) (8) Clip wires of each cable to equal length, strip 3/16" and tin. (9) If you are using Dean's connectors, refer

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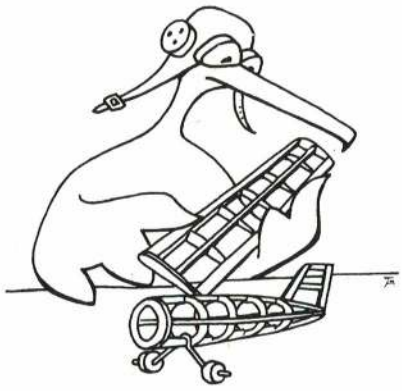

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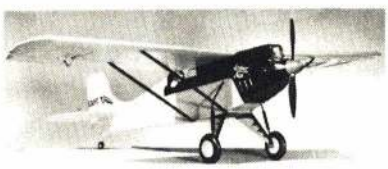

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to the two-channel construction notes. (10) Slip a rubber grommet over each of the cable sets. Work with one cable at a time. Slip a 1/2" length of 1/8 ID heat shrink tubing over the cable. Untwist one inch of the cable and slip a piece of sleeving over each wire. (11) Touch the wires and soldering iron to the respective pins of connector. The tinned joint will form quickly. Avoid excessive heat which may damage the plug. Perform this operation with the plug halves mated for a better heat sink. (12) Slip sleeving up over the pins and wires. (13) Repeat steps 10, 11, and 12 for each cable. (14) This completes the decoder. There are no adjustments to be made. The decoder is now ready for hook-up to receiver. (15) Connect the three-in. red (+4.8 V), three-in. black (OV), and three-in. white (signal) leads to the appropriate points on the receiver.

This completes the receiver-decoder. Review Part III for receiver tuning instructions.

Conversion

In order to convert from the two-channel receiver/decoder to multiple channels, it is necessary to: (1) modify the receiver slightly; (2) build a new decoder using some new parts but most of those from the two-channel decoder; (3) add more plugs and wiring; and (4) build additional servos. Virtually all one- to eight-channel digital transmitters will operate the new receiver-decoder. The theory for the modified flight pack is the same as described in earlier paragraphs.

The new parts needed are listed in Table 1. The builder must decide which of the three plug arrangements described earlier will be used and the appropriate plugs purchased. When completed, the modified receiver-decoder is the same size as the two-channel unit and will fit in the same case with the exception of making provision for added wiring.

The old decoder must be disassembled and certain components reused. The solder must be removed from individual leads without excess heat. The quickest and easiest method is to use a "solder sucker" of the squeeze-bulb type. Heat each joint enough to liquify the solder and then remove it with the solder sucker. Alternately, braided solder remover may be used to "wick" up the melted solder.

Use the following procedure:

(1) Make the decoder pc board using a negative of Figure 5 and the procedure described in Part 1.

(2) Unsolder the three wires that connect the decoder and receiver. These are the receiver positive, negative and signal. Unsolder at the receiver board.

(3) Carefully desolder all components from the decoder board and identify them as removed. Most will be reused. The decoder board may be discarded.

(4) Consult the drawing for the receiver (Figure 8) and remove the components identified by shading. Identify them for reuse as was done for the decoder components.

(5) Modify the receiver pc board as shown in Figure 9 by cutting the land marked using a sharp knife. Carefully drill the four new holes shown using a No. 64 drill or a No. 1/2 dental burr.

(6) Solder the components, identified in Figure 10, by shading into the receiver. Note that some of these were previously removed from the receiver. This completes the receiver modification.

(7) Construct the decoder following the instructions given for building a complete receiver-decoder.

(8) Connect the three wires (positive, negative and signal) between the receiver and decoder boards. This completes the entire modification. The receiver will not need to be returned unless another transmitter is being used. However, a range-check and possibly receiver peaking are desirable.

Turn on the transmitter and receiver in that order. Since there is nothing that needs tuning or adjusting in the decoder, all should be well.

The Servos

The servos were set up electronically to have extremely tight resolution with the two-channel set. However, this leads to excessive hum or jitter in some cases and is aggravated as servos are added. Accordingly, it is suggested that the builder modify existing servos built from Part II and change any new ones built by changing R-4 and R-5 to 33 ohms instead of 15 and by changing R-2 and R-3 to a value of 33K ohms instead of 47K ohms. Any new servos may be built in accordance with the instructions in Part II with the above changes.

UPPER CRUST *(from page 62)*

they will accept the bolts inserted through the bearers and then epoxy the blind nuts in place. Coat the inside of the cowl with epoxy cement and allow to dry. If the TeeDee is to be pressurized through the side of the crankshaft housing, then a hole will need to be drilled through the right side of the cowling to allow the pressure tubing to pass through to the tap nipple.

Additional comments about fuels will be made later, but it will suffice to say at this point that for effective competition it seems necessary to use a pressurized fuel system. This can be done two or three ways. Either 1) the crankcase backplate or 2) the crankshaft housing may be tapped or 3) a pen bladder may be used. I prefer tapping the engine for pressure as it is easier to

get a nice, clean flood-off motor cut. If bladder pressure is used with flood-off the excess raw fuel is dumped all over the front end of the airplane. With high nitro fuels, nothing short of epoxy finishes will withstand unburned fuel. The experts recommend that the backplate of the TeeDees should be tapped for the best flow of pressure, but the already available spigot or nipple that Cox puts on the side of the plastic crankshaft housing works very well.

Simply drill a 1/32" hole down the plastic nipple and through the aluminum housing. Stick a piece of fuel tubing on the nipple and run it to the fuel tank. Do not leave any burrs inside the aluminum housing. Of course, all of the drilling is done with the crankshaft removed.

How to pressurize the Cox TeeDees is very clearly explained in the instruction sheet with each engine. After the engine tap is completed, it is necessary to make an aluminum tubing nozzle to hang in the intake venturi to feed the flood of fuel needed to cut the engine. Make this nozzle out of 1/16" OD aluminum tubing. It can be bent (carefully) into shape without being heated. Make this aluminum nozzle long enough to allow it to be held in place by a thin piece of aluminum or brass shim stock shaped around it and secured to the engine by one of the mounting bolts. With the cowled version of the fuselage, it may be easier to run the flood-off tubing over the cowl side board and bolting it to the side of the fuselage. In either case, affix the aluminum nozzle securely in place so it will not vibrate out of the venturi.

If the cowled version of the fuselage is built, then an airtight fuel tank must be made with three brass or copper tube vents. Two of these tubes are to extend nearly to the bottom and rear of the tank for fuel pickup. The third tube should just pass through the top side of the tank by 1/16" or so. Allow the tubes to extend outside the tank about 3/8". 1/16" ID tubing should be used for the vents. Where they are placed in the tank will be determined by its shape and placement in the fuselage. Small diameter surgical tubing is used to hook the tank up to the engine. Run a piece of the surgical tubing from the fuel feed nozzle on the carburetor to one of the fuel pick-up vents in the tank. The other fuel pick-up vent is to be connected to the flood-off nozzle by surgical tubing which passes through the pinch-off mechanism of the Tatone timer. The third vent tube (the short one) is to be connected directly to the pressure nipple on the side of the crankshaft housing. Fill the tank by disconnecting two of the vents. If the system is free of leaks, then the engine will run smooth and will be stopped precisely and positively by the best of all cut-off methods.

If the Tatone tank mount is used, it can be pressurized quite easily. Simply drill out one of the top vents to 1/16" dia., slip a piece of aluminum tubing (1/16" OD) through so it extends nearly to the bottom of the tank, bend it to a rounded 90 degree angle just outside of the vent, and cut off. This gives a

second fuel pickup which is connected to the carburetor by a piece of surgical tubing. (I use the bottom vent as the flood-off feed.) When placing the surgical tubing over this vent be sure to slip it all the way over the original tank vent to make the coupling airtight. When the tank is mounted to the firewall snugly, it becomes airtight, but always check to make sure. If there is doubt of its airtightness, just coat the tank backplate seam with dope to seal it.

The wing and stab constructions are basically the same. There isn't anything unusual about the wing construction unless the geodetic rib layout is unfamiliar.

Begin by cutting out all the ribs. Use 1/32" sheet ply templates to cut out the ribs individually. Glue fine sandpaper to one side of the templates to keep them from slipping when cutting around them. When all of the ribs are cut out stack the chord ribs side by side and pin them together. With a sanding block and the assembly to a smooth, uniform airfoil shape. It helps to place plywood templates on the outsides of the stack of ribs to provide a hard form to limit the sanding. While the ribs are stacked together mark the spar positions and sizes across the top and bottom. Either saw these notches out with an X-acto or Zona saw, or file them out with ordinary files of appropriate widths (1/8 and 3/32"). It helps considerably if the notches have been precut in the two plywood templates attached to the outsides of the rib stack.

Stack and pin the geodetic ribs together as you did the chord ribs and sand to shape. Do not try to cut the spar notches in these ribs at this time. When all ribs are cut and sanded, pin the ¼" sq. medium-hard balsa leading edge in place. Pin the trailing edge down and mark the notches for the chord ribs. Remove the trailing edge and cut the rib notches in it to a uniform depth. Pin the trailing edge back in place and begin gluing and pinning the chord ribs in place. At the center sections of the wing glue in the 1/32" bottom sheeting before gluing down the ribs. Reduce the size of the three center ribs by 1/32" on top and bottom to accommodate the center sheeting. Do not glue the center rib in at this time. The ribs at the two outer dihedral joints are to be tack glued so they can later be cut away to add the dihedral braces.

After the chord ribs are glued in place, then cut all of the geodetic ribs in half and begin fitting them into place. Do not try to cut the 45 degree angles on the geodetic rib pieces, but instead use a sanding block to sand in the angles as they are fitted to size. This is faster as you just "hit" the ends a lick or two and it's done. Any severe shortening of the geodetics that is needed is done on the leading and trailing edge ends of the rib halves. It really isn't as much trouble to fit the geodetics as it appears.

With all ribs in place it is then time to cut the spar notches in the geodetics. Now this can be a nuisance and even

difficult the first time. Naturally, these notches must line up with the notches in the chord ribs. A jig setup was devised that makes it a snap. Not only does it remove the tedium from the task, but it is accurate. First cut a piece of 1/8" sq. balsa about ½" longer than enough to span the two spaces between three chord ribs. On one of the sides of the 1/8" strip glue three smaller 1/8" sq. pieces, each about ½" long. One is glued at either end and the third is glued in the center. Refer to the photo for clarification. Next glue a strip of balsa on the side of a new single-edge razor blade running parallel to and 1/8" from the cutting edge.

After the glue dries on these two "tools," you are ready to cut the 1/8" spar notches in the geodetics. Place the three "legs" of the balsa jig in the 1/8" notches of three chord ribs. This allows the balsa strip to span across two geodetic ribs and serve as a cutting guide. Use the razor blade with the balsa strip glued to it to cut the notches. The balsa strip on the side of the blade will act as a stop and results in notches of the correct depth. By slicing the geodetics on both sides of the jig, the notches will also be the correct width. Proceed along the wing until all geodetics have been cut. Remove the notch tabs and all of the notches will be aligned.

The same procedure is used for the 3/32" sq. spars on the wing and stab, except, of course, the jig must be made of 3/32" sq. balsa. Another razor blade will need a balsa scab to set the cutting depth at 3/32"

Now the wing is ready (no spars yet) to have correct amounts of dihedral glued in. After the dihedral joints have set, the spars on the top of the wing can be glued in place. Cut the plywood dihedral braces to the correct angle and length. The ribs at the dihedral breaks will have to be cut loose and shortened at the leading edge to allow the braces to be glued in place. Sheet the top of the center sections with 1/32" balsa. Glue silk or nylon over the trailing edge at the dihedral joints. Insert the 45 degree gussets between the wing tip pieces and the end chord ribs and pin in place until the glue dries. The tip can then be shaved and sanded to the airfoil contour. The top spars can be cut to length and glued in place.

After the glue has dried on this framework, it can be removed to cut the geodetic notches on the bottom side of the wing. I do this by holding a narrow (about 12 in.) board on my lap and placing the wing upside down on it for support. Use the jig to cut these notches just as on the top. Then glue the spars in place. After all spars are in place, sand the top and bottom, especially at the rib and spar intersections. Don't worry if in the process the top curve of the ribs are sanded flat between spars in the process —it won't bother the airfoil effect of the wing. On this type of construction the tissue always shrinks flat (no airfoil contour) between ribs and spars anyway. Sanding carefully allows a nice smooth joint at the spar and rib intersections.

Cover the plane entirely with jap tissue. The wing and stab framework get two or three coats of dope before the tissue is applied. Stretch the tissue tight by spraying with water, then apply five to six coats of dope. If black tissue trim and numerals are to be applied, do this after the first or second coat of dope.

Nitrate dope should be used to apply the tissue to the fuselage, that is, if epoxy paint is to be used. Apply about two coats to the bare wood, sand with fine sandpaper and apply the tissue. Give it one more coat of nitrate and let dry thoroughly. Give the entire fuselage two coats of clear epoxy paint. This is the only paint that will stand up to high nitro fuel. Use a tack cloth to remove all dust from the fuselage before epoxying. If you use a slow-drying epoxy, protect the surface from dust while drying by suspending the fuselage in a garment bag or a canopy made of plastic bag from the cleaners. Hang the fuselage so it doesn't touch the sides of the bag. If nitrate dope isn't available for the fuselage, use Aero Gloss.

The dethermalizer limit string is made by forming a loop out of a strong line. Radio dial cord is excellent. It has absolutely no elasticity and is the strongest cord I have ever come across. The loop in the cord should be just big enough to pass over the rudder and tail of the fuselage. There should be a two- to four-in. strand of cord attached to the loop. Fashion a hook from a paper clip and tie it to the end of this strand of cord. With the stabilizer rubber banded to the stab-seat, place the chord loop over the DT hook on the stab (see plans) and stretch a 1/8 x 3" rubber band from the paper clip hook to the hardwood peg in the left side of the fuselage. If the peg and snuffer tube have been lined up correctly, the stretched rubber band should fall across the opening of the tube. Insert the dethermalizer fuse between the strands of the rubber band and into the snuffer tube. This system makes it easy to ignite the fuse and best of all, using Sig fuse, it has never failed. The dial cord loop limits the stab to about a 45 degree angle. Tie a knot in the loop of dial cord about an inch from the DT hook on the stab. This shortens the size of the loop to keep it from flipping up and over the rudder upon dethermalizing.

Have you seen what's on page 84?

Although I don't use this technique, gluing keys ½" long made of split 1/8" dia. hardwood dowel to the bottom of the stab and wing on either side of the seats will keep them properly aligned. I prefer making a visual check of the flying surfaces before each flight. If one of the keys slips up on the seat accidentally, you are in for a flight that is hard on weak hearts.

Keep the ship light. I can't seem to do it. All my Upper Crusts have weighed from 8½ to 8-3/4 oz., motor and all.

Flying

After the dope and epoxy paint have dried for three or four days you are ready for flying. Rubber band the wing and stab to the fuselage, hook up the fuel lines, timer and dethermalizer cord, stick on a 6-3 Cox gray prop, and check that the balance point is very near the indicated CG position. If the balance point is more than a quarter of an inch off, add weight to correct it. (If there has been a careful choice of balsa there shouldn't have to be any weight added.) The original Upper Crusts have always balanced out OK. That's partly due to the first two or three being built so the pylon could be shifted in the fuselage to properly position the CG before being glued in place.

Next, check the wing and stab for warps. Eliminate any warps by holding the warped area over steaming water and twisting the wing in the opposite direction of the warp. Hold for a few seconds and allow to cool, repeating until all warp is removed. Upper Crusts have been flown with and without wash-in in the right inner wing panel. Whether it is needed or not depends on how the ship is adjusted for the climb.

Wait for a fairly calm day and head for the flying field. The first thing to do at the field is check the glide. Pick a spot about 25 or 30 feet in front of you and gently toss the plane at the spot. Glide the plane into the wind. If it stalls, shim up the leading edge of the stab about 1/32". Never use more than 1/32" thick shims at a time and make them from plywood to assure constancy in thickness. Now toss the plane again. If it stalls, add another 1/32" shim under the trailing edge of the stab. Make the corrections necessary until the glide is relatively straight and steady with just a slight tendency to stall. This stall should barely be noticeable. Then tack glue the shims in place.

Upper Crusts are always adjusted for a right-right pattern. I like to get them in the glide turn as soon as possible after the engine quits. For me that is a right-right pattern. To get the right turn in the glide, tilt the right side of the stab up by placing 1/16" sheet shims, one per each test flight, under both the leading and trailing edges at the right side of the seats. This usually will require one shim, but at times a little more has been needed. I tend to glide my ships in tighter circles than most modelers. Check the effect of the stab tilt by tossing the plane at that spot again. There should be some indication of a right turn. If there isn't, shim up the right side a little more until the glide shows some turn. The slight tendency to

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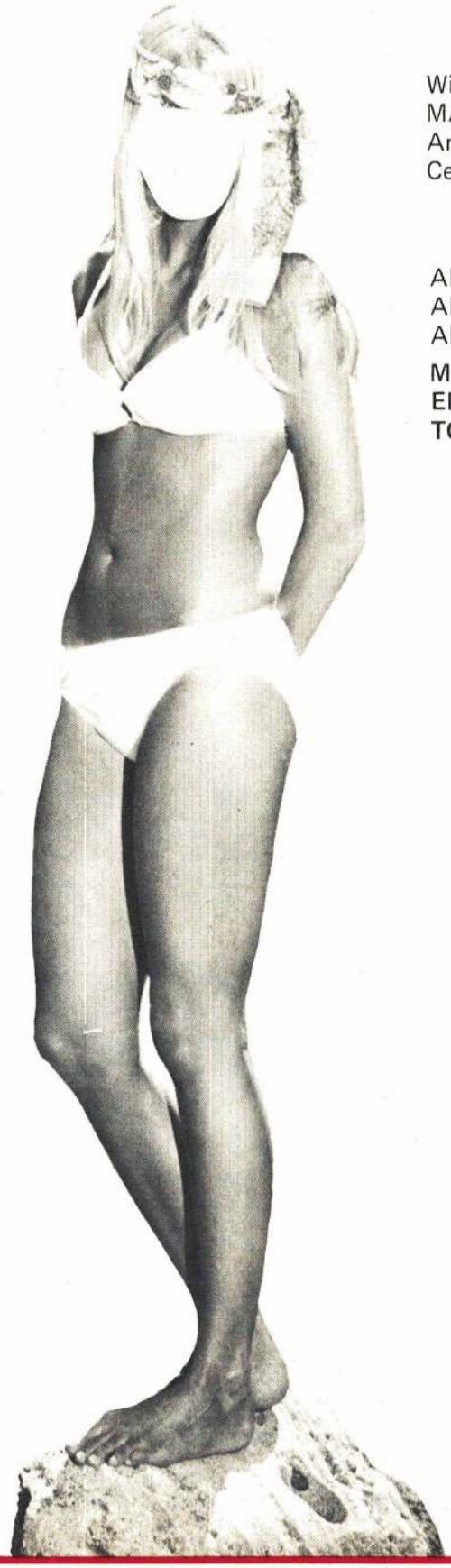

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stall should disappear when the turn becomes evident. Normally, the tilt of the stab should make it just about parallel (as viewed from front or rear) with the inboard panel of the right wing. If the tilt has become what looks excessive, then remember back to the glide pattern before adding the stab tilt. Did it tend to turn left? If so, it probably has a "natural" left turn. In such case you may want to use a right power-left glide pattern. Be sure the "natural" turn is not due to warps.

Now to set the right power turn. Most all of these ships needed very little, if any, right rudder. I don't use big looping spirals in the climb, but more of a straightaway (up at about 80 degrees) climb with a slight corkscrew turn. Try to get it to make about one turn, which really is more like a twist, in about ten sec. of power. A little more won't matter, but I never like for them to turn more than 1½ times in ten sec. Many fliers use large spirals in the climb for two reasons: 1) It is a safer climb and 2) The plane "rolls out on top" of the power pattern with very little loss of altitude. However, you have probably noticed by now that the Upper Crust has a rather large stab and the wing and stab are somewhat short coupled. Both of these features will work together to flop the plane out on top with nary a drop in altitude. There have just never been any roll-out problems with this design.

To set the right rudder, cut a piece of 1/16 in. sheet balsa about ½" sq. and sand it to a trailing edge shape. Tack glue this on the right side of the rudder at the trailing edge. The thick edge of the balsa piece should be rearward. This will probably be a little more than you need, so shave it down as you test to straighten out the climb.

Now to add the power. Set your fuel timer for about three sec. running time. There are two popular procedures for power testing. One is to start at rich settings (low power) and gradually work from low rpms to high rpms and from short runs to long runs. The other method is to start at full rpm (peak power) and test in very small increments of timer settings. In both cases adjustments are made in trim settings to correct improper power patterns. I prefer the second method because a hot ship performs differently at low rpm than it does at high rpm. It is well to know the tendency of the power pattern immediately after launch and the high rpm-short timer settings method does this. If the other method seems safer, go ahead and use, but when shifting from low rpm to high rpm be sure to cut the timer back to three- or four-sec. settings.

With the engine running (be sure to use DT fuse on all test flights), release the plane at about a 75 degree angle and watch carefully the directional tendencies. If it flies straightaway, fine. Just add another second or so to the timer setting and launch again. Work up to a full 10- to 15-sec. motor run. If the plane tends to roll to the left (not likely), more right rudder needs to be added. If the plane turns right, but not

severely, it is safe to add more motor run and try again. If the right turn is severe, that is, it drops the right wing and turns hard, then remove all of the right rudder trim tab and try again with neutral rudder. If it still persists in turning to the right immediately after releasing, add a couple of degrees of left thrust. Some of the Upper Crusts needed left thrust and some didn't.

It is well known that most pylon ships climb to the right. For this reason about 1/8" wash-in should be warped into the inner right wing panel. This keeps the right wing up in case of a hard turn to the right, but, more importantly, it puts that twist or cork screw in the near vertical climb. Make the necessary trim adjustments until the flight pattern suits your nervous system. One word of advice, always, but *always*, launch at the 75 or 80 degree angle (nearly straight up). The adjusted Upper Crust under power tends to fly in the direction pointed, and if you launch nearly horizontal to the ground, it consumes too much of the motor run getting its nose up.

Contest Flying

For a high incidence of contest success with a plane as large as the Upper Crust, there are two or three paramount requirements:

(1) Your airplane must be consistent in flight pattern—the Upper Crust is.

(2) You must use a really hot fuel, that is, fuel with high nitromethane content. Many fliers who compete with a high degree of intenseness mix their

own fuels. There aren't many stock fuels sold which these fliers consider hot enough. However, I have used K&B Speed Fuel and feel it is just fine. The fuel that I really like is one that Jim Clem (of *Witch Doctor* fame) told me about two or three years ago, and that is RAMM fuel. It is really super, but it can't be found in the hobby shops anymore. A year or so ago George Aldrich wrote an article in which he indicated that RAMM was a good fuel and he listed the formula. George sells the RAMM fuel already mixed. Not only does he sell RAMM, but another concoction which he says is better (hotter) than RAMM. He gave no name for it so just ask for the "hotter than RAMM" stuff. These fuels are $4.00 per quart and $14.00 per gallon. Both are shipped truck collect. His address is Aldrich Models, 3219 Shady Springs, San Antonio, Tex.

(3) When using the super hot fuels a flood-off system of stopping the TeeDee 049 and 051 engines should be used. By using RAMM with a pinch-off timer I blew a plug on almost every flight. Knowing practically nothing about engines it was just assumed to be the high cost of using RAMM. Then a speed flier in Wichita, who also fiddles with engines, told me that the plug was being "blown" at the end of the engine run when it leaned out. He suggested that a switch to the flood-off system would help. Eureka, it worked! No more blown plugs (well, not so many). It is a simple matter to pressurize the TeeDees, so why not.

No one can guarantee success for another, but all that has been related here are bits and pieces that have helped me begin winning and I hope they will work for you. If you are already winning and the Upper Crust appeals to you, build it, and you will continue to win.

PRAIRIE DUSTER

(Continued from page 44)

lage as before. Remove wing and drill 1/4" hole through it. Spot face the bottom side for the wing screw head to the surface of the plywood doubler inside the bottom sheeting.

Make holes in a piece of waxed paper for the dowels and wrap the waxed paper around the leading edge. Install the wing and screw down tight. Prepare a bulkhead of 1/8" balsa faced with 1/32" plywood and fit it in behind the LE bulkhead, beveling it to match the wing LE. Holding it in place, mark with the outline of the LE bulkhead. Remove and trim to 1/8" less than the outline. Now glue it in place on the wing, tight against the LE bulkhead with the waxed paper between. When glue is well cured, remove wing from fuselage and plank with 3/16" strips from this new bulkhead back to the wing. Replace wing and sand the planking to conform to fuselage. Sand the TE bulkhead and bottom of fuselage to match TE of wing.

Tail Construction: The stabilizer is built on a flat surface as shown in the detail on the plans. Glue a strip of 3/32 x 3/16" balsa to the 3/8" square leading and trailing edges. Lay the LE and TE on the outline spacing them up off the table 3/32". Now glue in the 9/16" high

ribs. After glue has cured well, sand the ribs carefully to a streamlined shape while the outline is still pinned down. This is best accomplished with a 12" sander making short spanwise strokes. Now notch the ribs and glue in the top spar. Cut the top sheet to shape for a good fit inside the LE and TE and glue into place, weighting down as required until glue cures. Turn over and repeat the process for the bottom side. Sand to shape.

Elevators are shaped from 1/4" balsa and the elevator horn-yoke is fitted to them. Do not join the elevators until stabilizer is installed in fuselage.

The stabilizer should not be installed in the fuselage until the wing has been fitted and attached so that the horizontal tail will be truly horizontal. When this lineup has been completed, glue the stab into the fuselage. Slip the elevator yoke through the fuselage behind the stab with the horn on the proper side. (You probably want the elevator horn on the same side as the throttle so that the rudder servo will be on the opposite side and the nose wheel steering cables or rods will not interfere with the throttle.) Now hinge one elevator and attach it to the yoke, using waxed paper between the yoke and the stab. When epoxy has cured, hinge the other elevator, making sure the two stick on top and bottom of both elevators until epoxy has cured.

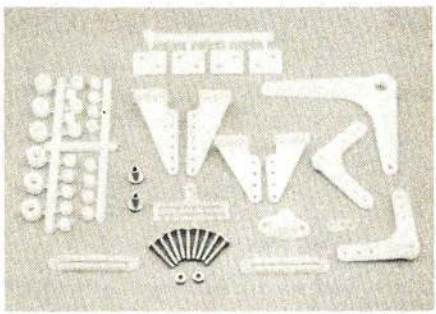
Fin construction is similar to stabilizer except that the sheeting will go over the leading and trailing edges instead of between. Glue the tail post in position, lining it up at 90 degrees to the plane of the stabilizer. When dry, fit and glue on the leading edge. Get this piece on straight and you will have a straight fin. It is very difficult to warp a triangle. Install the ribs and sand to a streamline. Prepare *both* of the 3/32" covering sheets and glue them on simultaneously, clamping together with clothespins. By putting them on at the same time you will not introduce more camber to one side. When glue has set, sand fin to shape and hinge the rudder to it. Fillet the fixed surfaces to the fuselage. We used Epoxolite for fillets, smoothing it on with water. If you try Epoxolite for the first time, be sure the wood is waterproofed with the undercoats of your finish before starting.

Flying

Balance at four-in. behind the LE bulkhead with an empty fuel tank and gear retracted. Set all surfaces to zero degrees with transmitter trim knobs at neutral. If all your surfaces are true, the ship will lift off easily, and all surfaces will be easily within range of the trim knobs to establish straight and level flight at full bore throttle. Once you have established this trim, you should be able to do any of the C or D pattern maneuvers in fair to good style. It may be necessary to weight one wingtip, to eliminate uneven trim of the ailerons, before the inside maneuvers match the outside maneuvers, but with a little patience in trimming, your Prairie Duster will perform the complete pattern with an excellence to match your agility in stick manipulation.

TOLEDO PRODUCTS

(Continued from page 76)

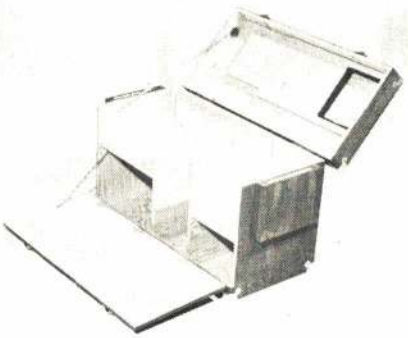


KRAFT SYSTEMS/ACCESSORY ASSORTMENT—A new fittings package designed to offer many different types of aircraft items in one package at a low price. Fittings included are two long horns, two regular horns, four horn plates, two 90-degree bellcranks, one flying stab bellcrank, pushrod exits, antenna flag clip-ons, 25 push-on collars, screws and bushings. All are molded plastic. $1.95. Kraft Systems, Inc., 450 West California Ave., Vista, Calif. 92083.

MIDCO/"EXECUTIVE" FLIGHT CASE—

This flight box is in a briefcase style designed especially for the modeler. Case is constructed of all vinyl and is 100% fuelproof. Enough room is provided for all items required for a normal flying session including gallon can of fuel, transmitter, batteries, etc. Case is 16 x 5 x 12". $13.95. Midwest Model Supply Co., 6929 West 59th St., Chicago, Ill. 60638.

KRD/SERVO ANALYZER—A tester designed to check out servo throw and condition. Can be used to "burn in" servos as the tester has an automatic position which works the servo continuously throughout its cycle. Also has a manual position. For three or four wire, negative or positive pulse servos. $24.95. KRD Products, Box 3391, Shawnee, Kan. 66203.



RICHARD'S ENTERPRISES/FIELD BOX AND TIMER—Constructed of rugged ply-

(Continued on page 110)

S/B SANTA BARBARA ONE DESIGN. More than five hundred sold — and #10 can still beat #500! Length 70 in., mast 72 in., sail area 1100 sq. in., displacement 28 lb. Prefinished fiberglass hull, deck, cabin and keel $165.00

SOLING-M. Scaled from the exciting new Olympic-class three-man keel boat. Length 50 in., mast 60 in., sail area 800 sq. in., displacement 18 lb. For American Model Yachting Association 50/800 "M" class racing. Prefinished fiberglass hull and deck, machined cast-iron keel . . . $125.00

BOTH KITS include finished Dacron® sails, spruce spar blanks, stainless rigging, brass fittings, and die-cast aluminum rudder. For two- or three-channel r/c operation with the Vortex sail control unit.

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Official magazine

A.M.A. NEWS

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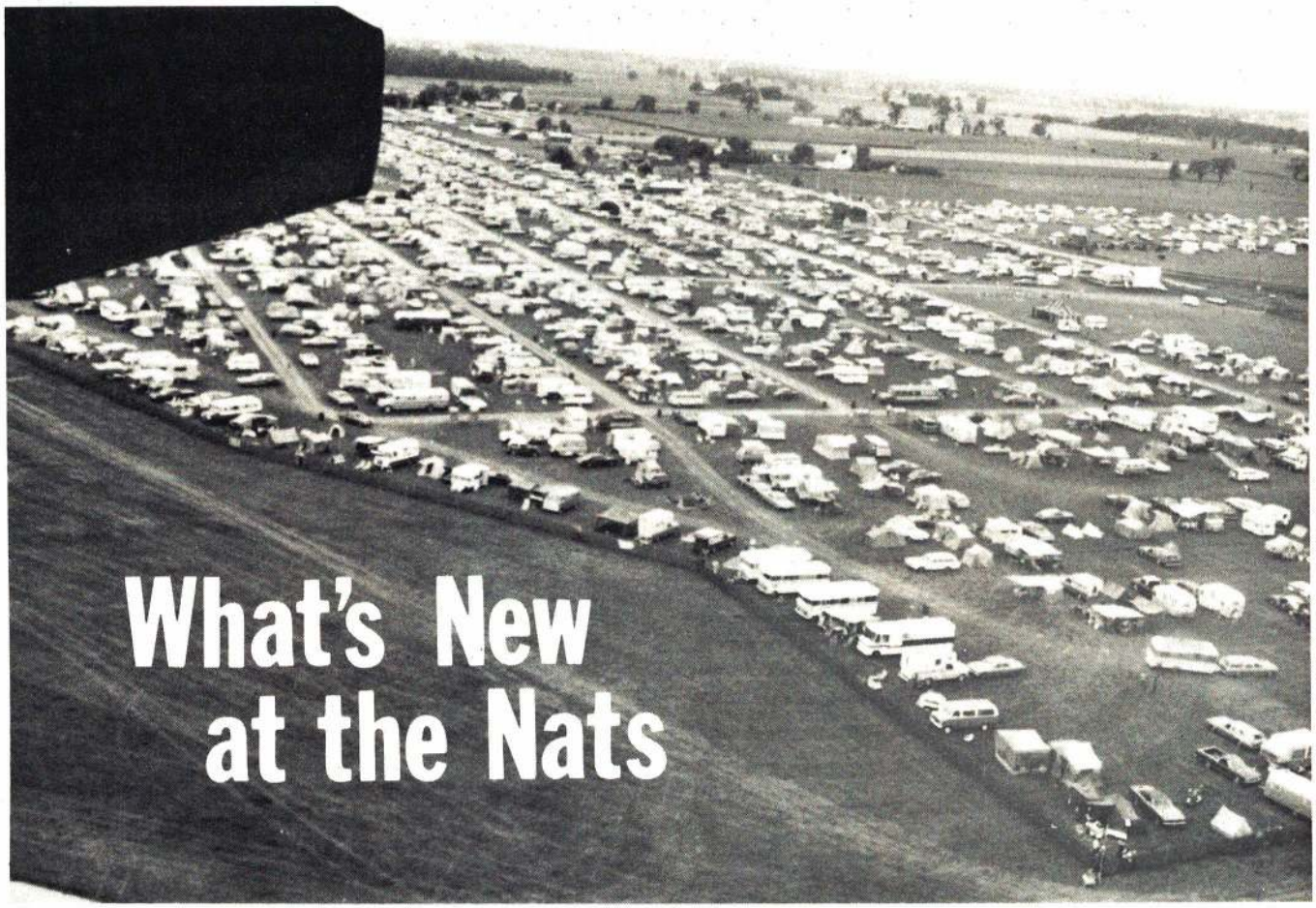

What's New at the Nats

Air view shows campground of the Experimental Aircraft Association during the 1972 annual Fly-In at Oshkosh, Wisconsin. AMA members will use the area for the 1973 Nats. Plenty of room for tents, trailers, recreational vehicles; clean, cozy, and close to the action.

Permanent 'tent' is steel-roofed open-air meeting building which will be used at the 1973 National Championships for Junior Programs, talks, movies, demonstrations, other forum type events. Building has a built-in stage, screen, and film projection equipment.

The most noticeable difference will be the lack of a military atmosphere which has characterized the Nats for the past twenty-five years. Clean and green is the scene for 1973—Wittman Field at Oshkosh, Wisconsin, is a picturesque country airport, but with modern facilities. Instead of deteriorated buildings and crumbled runways of the past which have resulted from too many years of cutback military budgets, Wittman Field is an up-to-date and fast growing community airport.

The portion of the field which will be used for the '73 National Model Airplane Championships includes new buildings especially built for sport aviation events; also an excellent permanent campground with shower facilities, streets and country store. There are permanent outdoor telephones, drinking fountains, street lights, a cafeteria, a huge

steel-roofed 'tent' for movies, talks, demonstrations and awards. There's also another large building for use as a contestant's workshop—equivalent to the hangars used for this purpose in past years.

The facilities belong to the Experimental Aircraft Association which is cooperating closely with AMA to produce the '73 Nats. In addition, the county is lending the use of its largest runway, 150-ft. wide and 6,700-ft. long, for the Nats competition events. The layout of the EAA portion of the site in relation to the runway provides for a much more compact type of Nats than has been typical in the past—all events will be located along one straight line rather than all over the airfield. As a result traffic and related problems on the airport are expected to be considerably less than usual.

A special airshow area will entertain spectators daily and keep them from interfering with competition activities. This will also permit more effective PR for the general public—all types of models will be flown in the show area to avoid the necessity of crowds elsewhere on the field. An excellent public address system in this area will be used to educate spectators as to what the Nats is all about.

In order to protect and preserve the extensive grass areas on the airfield, vehicles will be permitted to drive and park only on roads and certain taxiways. But to minimize transportation problems that this restricted vehicular traffic pattern could create, a special continuious service, tractor-trailer runway-line transportation system will be used. Also, to

(Continued on page 104)

Official bulletin board (above) and entrance gate (below) at Wittman Field indicate the type of permanent facilities being provided by the Experimental Aircraft Association for the use of AMA contestants at the '73 Nats. The use of EAA equipment and facilities will add to the attractiveness of the Nats, in contrast to the often makeshift and temporary arrangements of past events. The challenge will be for AMA members to maintain the extremely clean grounds in the same manner as EAA members.

OFFICIAL SCHEDULE—1973 NATIONAL MODEL AIRPLANE CHAMPIONSHIPS—AUGUST 5-12

Except as noted, events are from 8 am to 5 pm. All outdoor events at Wittman Field, Oshkosh, Wisc.; indoor events in Chicago as noted below.

	SUN	MON	TUES	WED	THURS	FRI	SAT	SUN
Free Flight **FF**	Indoor HL Glider, 9 am—3 pm Scale, 3 pm—9 pm	Indoor 9 am—9 pm Stick Paper Stick Cabin		B Gas Nordic A-1, A-2	1/2A Gas Wakefield Scale Rubber[1] Scale Gas[1]	A Gas Unlim. Rub.	FAI Power HL Glider Coupe D'Hiver	8 am—1 pm C Gas Rocket
Control Line **CL**			1/2A Proto 1/2A Profile Proto—Jr.	R. Race—Op. Stunt—Sr. 1/2A Speed Combat—Jr.	R. Race—Jr. R. Race—Sr. Stunt—Jr. A Speed FAI Speed Combat—Op.	Scale Racing Stunt—Op. B Speed B Proto Combat—Sr.	Scale[2] Stunt—Op. Finals C Speed Jet Speed Carrier—I II & Prof.	8 am—1 pm FAI Team Race
Radio Control **RC**		FAI Pylon Qualifying 1 pm—5 pm	Form. I Pylon Qualifying	C Pattern Qualifying	C Pattern Qualifying	C Pattern Finals[1] Scale[1] Pylon FAI Finals[3]	C Pattern Finals[1] Scale[1] Pylon I Finals[3]	8 am—2 pm A & B Pattern
RC Transmitter Processing		8 am—noon[4] 7 pm—9 pm[5]	7 pm—9 pm[5]				5 pm—6 pm A & B Pattern[7]	
OUTDOOR EVENTS Registration[6]		8 am—noon 1 pm—5 pm 7 pm—9 pm	8 am—noon 1 pm—5 pm 7 pm—9 pm	8 am—noon 1 pm—5 pm	8 am—noon 1 pm—5 pm	8 am—noon 1 pm—5 pm	8 am—noon 1 pm—5 pm	
Late Entry MONDAY ONLY		1 pm—5 pm 7 pm—9 pm	[1]8 am—1 pm [2]Noon—5 pm [3]1 pm—5 pm [4]Priority for FAI Pylon [5]All RC Events—Note cut-off time for registration. No transmitter processing unless entry and registration is completed (at Nats AMA HQ before 5 pm). [6]For those pre-entered by mail. [7]At RC Pylon site after conclusion of Pylon Finals. Entry and registration must first be completed (at Nats AMA HQ before 5 pm). [8]At Brig. Gen. Richard L. Jones Armory, Chicago.				J. Walker Stunt Flyoff 1 pm
Add Events MONDAY ONLY		1 pm—5 pm 7 pm—9 pm						
Indoor[8]: Registration[6], Late Entry, Add events and Awards	9 am—noon 1 pm—5 pm Awards at 3 & 9 pm	9 am—noon 1 pm—5 pm Awards at 9 pm						MODEL AIR SHOW 2 pm—4 pm

Campers at the 1973 Nats will find the nearby shower building shown above to be a refreshing change from the remote wash-up facilities of past Nationals campsites. Similarly, the tractor drawn trailer shown below will provide regular flight line transportation. Both of these conveniences are being provided courtesy of the EAA, as are many of the other facilities shown on these pages.

Hopefully the antique classic Ford Tri-Motor, shown above at the 1972 EAA Fly-In, will be on hand in 1973 and stay over for the AMA Nats, to offer sightseeing flights for modelers and their families. Another new feature at the '73 Nats will be the huge cafeteria tent shown below, where snacks and full meals will be served at reasonable prices. The tent will be in addition to the usual refreshment stands.

The Wittman Field control tower, shown in the background above the AMA Hobby Shop, is the principal landmark for the EAA area and center of AMA activities; on the west side of Wittman Field, well away from the airline terminal and hangar area.

assist retrieving of Free Flight models, use of motor and mini bikes will be permitted, but not on grass areas.

For the first time it will be possible to fly to and from the Nats airfield all during Nats week. Light planes can fly in and tie down near the Nats headquarters area, and airline flights will maintain normal schedules at Wittman Field without interfering with Nats operations. Also, if current planning is confirmed, AMA members at the Nats will be able to buy rides on such famous antique airplanes as the Ford Tri-Motor and Boeing's pioneer 247 airliner. World War I and other famous aircraft will also be on display.

There will be a picnic-type atmosphere, with particular emphasis on accommodations for families. Movies will be shown at night for entertainment of kids and adults. Excellent food facilities right on the Nats portion of the airfield will make it easier to live on the site day and night. Besides the usual Nats hobby shop there will be sales of daily living essentials, souvenirs, film, and other such basics. In others words, a lot of the hardships of past Nats will be eliminated–the aim is to make this a happy and relaxed Nats which is more of a genuine vacation rather than a physical endurance contest.

Dormitory accommodations within three miles will provide excellent and economical lodging. Here, again, families will benefit since it will no longer be necessary to separate husbands and wives, daughters and sons, sisters and brothers. The accommodations are modern, in high-rise hotel-type buildings. A modern university cafeteria, snack bars, and numerous vending machines will provide for feeding those who live in town for the Nats; plus many excellent restaurant and snack-type hamburger havens near the dormitories and many motels of the area.

INDOOR EVENTS. Just as copy for this issue was being "frozen," a decision was reached to stage the Indoor events in Chicago at the Brig. Gen. Richard L. Jones Armory (formerly named Washington Park Armory)

PRESIDENT'S MEMO

'73 Nats--It's Oshkosh, B' Gosh

A COMPLETELY NEW ADVENTURE awaits AMA and its members for the 1973 NATIONAL MODEL AIRPLANE CHAMPIONSHIPS! The opportunities are limitless. EVERYTHING WILL BE NEW except modelers and model airplanes. And the competition scheduling will remain essentially the same.

LET ME LIST SOME OF THE "FIRSTS." First "Country-Club" Nationals ** An area "Green and Clean," beautifully developed by the Experimental/Sport Aviation Association, the Wittman Field Airport Authority and the Winnebago County Chamber of Commerce ** Relaxed surroundings, not in the middle of a metroplex ** Enthusiastic community support ** Smack in the middle of a vacationland ** Usual hot Nats weather should be cool and comfortable ** Greater choice of where to stay and how "high" to live ** Best housing bargain: rooms in the ultra-modern University of Wisconsin-Oshkosh dormitories. We've personally checked these out, and you'll never get a better housing bargain for a combination of price and comfort! School cafeteria available, too, and again a bargain! ** Vast camping facilities available on the contest site grounds, with showers, toilets and a "country store" ** Fly your own plane right into the airport if you wish! Airline service also available direct to Wittman Field all during Nats week ** Excellent variety of foods available right on the site, with many excellent area restaurants within a few minutes' drive (could lead to real "fat" fun, so watch it!) ** A genuine treat and privilege to use these excellent facilities developed over several years by foresight of the Experimental/Sport Aviation group, even including a bunch of permanent buildings they have built, which we shall use for displays, demonstrations, symposiums, movies and so forth ** Most ideal and inviting facilities we have ever had to attract whole families.

DON'T WASTE ANOTHER MINUTE! Go pack your duds right now, grab up the family, an armload of model planes, a couple tubes of glue, feed the cat, and head out for Oshkosh! WE'LL MEET YOU THERE THE WEEK OF AUGUST 6TH THROUGH 12TH. Our Nats follows immediately the famous Experimental/Sport Aviation Association Fly-In: TWO SOLID WEEKS OF THE WIDEST VARIETY OF AVIATION YOU WILL EVER WITNESS!

As this was written the detail planning for our National Championships was really just starting, and the possibilities are so vast and fresh that we are like kids in a candy store! I am sure that after the initial reaction, "Gosh, it's still farther away!" wears off and the new opportunities sink in, you will be as enthusiastic as we are and will pitch in to be our typical excellent AMA contestant and spectator types–and with this new spirit of helping us open up "unexplored ground."

John Worth and I went to Oshkosh as soon as the solid decision was made. If we had lacked anything in enthusiasm, the local people would have immediately "brainwashed" us. Their enthusiasm toward us and this activity, which they had never seen before, was terrific. I had met Paul Poberezny before during the planning for Transpo 72. But there in Oshkosh, where with him as president the EAA (now SAA) has daringly leased half of the municipal airport, improved the land, sodded it, built buildings and put on annually the world's biggest air-extravaganza, Paul Poberezny was a proud lion of dynamic energy, pacing the cage of this airpark that his organization had built. You think these guys aren't operators? LAST YEAR at their Fly-In they had over 9,000 aircraft operations off of and onto Wittman Field in ONE DAY, and over 43,000 in ONE WEEK! And all this was done without shutting down normal airport operations.

We found the fellow to credit for the commercial airport's success and for a great amount of the go-between magic involved in the commercial airport operations, the airlines, an untold number of private plane landings, tie-downs and takeoffs, the Chamber of Commerce and the EAA's Fly-In! He is the very dignified manager of Wittman Field, the municipal air facility. He, like Paul Poberezny, is a guy who is proud of what he is doing! This man, Michael T. Brock, radiates warmth and welcome. His office is in the Airport Terminal Building, and in this building, which could have been cold and impersonal,

AMA President, John Clemens.

Mr. Brock has build an aviary entirely across one end and "peopled" it with colorful rare birds–his building has come alive with some of his own warmth!

Well, fellow AMA'ers, how about that for a couple of character studies? Now, all I have to do is try to match 'em! You can bet I'll try!

NOW, FOR A FEW FACTS. Oshkosh is about 140 miles north of Chicago. It is about 80 miles from both Milwaukee and Madison, and 40 miles below Green Bay. It is on the western shore of Lake Winnebago, and is the hub city of a semi-circle of other enthusiastic small communities, such as Appleton, Neenah, Menasha, Ripon and Fond du Lac. The state bird is the robin, a songbird; the state flower is the delicately beautiful violet; the state tree is the sugar maple; and the state motto is FORWARD! That all sounds delightful!

And so it is–FORWARD TO OSHKOSH, and a whole new world for AMA.

John E. Clemens
AMA President

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on Sunday and Monday, August 5 and 6, instead of on the usual days of Monday and Tuesday. The armory is the building used for the 1972 Nats, located at 5200 South Cottage Grove Ave., and having a ceiling of approximately 90 feet. Sunday will have Indoor HL Glider from 9 am to 3 pm Indoor Scale from 3 pm to 9 pm. On Monday, the Indoor rubber events of Stick, Paper Stick and Cabin will be flown simultaneously from 9 am to 9 pm.

The Chicago site was chosen because visits by Indoor flyers to buildings nearer to Oshkosh did not result in a favorable recommendation; the closer sites were felt to be inadequate. The Indoor dates begin a day earlier than in previous years in order to provide for Indoor flyers to travel to Oshkosh (about 160 miles away) before the outdoor events begin, and also to avoid overlap of the Indoor events with the ½A Proto Control Line events which have been scheduled for Tuesday this year (a factor for those seeking championship points).

Another feature of the Indoor events this year is that they will be entirely self-contained and not dependent upon administrative operations at Oshkosh. This means that registration, late entry and event additions all may be accomplished at the armory–also that tabulation and prize-giving will take place at the Indoor site.

ENTER EARLY. Entry forms and fees must be postmarked by June 29 if entry is to be made at the most economical rate. After this date, entry can only be made at the Nats and, for outdoor events, only on Monday, August 6, from 1 pm to 5 pm and from 7 pm to 9 pm. Late entry for Indoor events may be made at the Indoor site on both Sunday and Monday, August 5 and 6. Write to AMA HQ for entry forms, and enclose a pre-addressed and stamped (8 cent) envelope with each request.

It's a new era for the Nats. All planning is aimed at improving conditions and facilities, compared with past Nats. It's a big challenge for AMA to do this without military personnel and other support of past years. And, even though time is short due to a late start, the outlook is good for a bigger and better Nats for '73–at Oshkosh, by gosh!

1975 FF World Champ Team Program

The 1975 Program Administrator is Bill Bogart of Pasadena, Calif., and the Team Finals fly-off site is intended to be Taft, Calif., if the site is available and suitable sponsors come forth. Future Team Finals sites may be rotated on an East-Central-West basis if suitable sites and sponsorship can be obtained and if so approved by a majority of previous program participants.

This program, details of which follow, was developed by the National Free Flight Society FAI Activities Committee having as its members Dick Lyons, chairman, Libertyville, Ill.; Bob Champine, Newport News, Va.; Stan Chilton, Wichita, Kans.; and Tom Hutchinson, Pasadena, Calif. The program is based on results of a poll of 1973 FF Team Selection Program participants and has been approved by the AMA president.

Purpose

The two-year program will select the 1975 U.S. FAI FF World Championship Teams through competitions consisting of Qualifying Trials, regional Semi-Finals and a single-site Team Finals. Teams of three men each will be chosen for Wakefield Rubber, FAI Power and Nordic A-2 Towline Glider. The location of the 1975 FF World Championships has not yet been established.

Rules

Model and flying specifications are in the AMA rule book, pages 64-66 of the 1972 edition. The Qualifying Trials stage is run by the full seven flights provided by World Championship rules (not by the 3- or 5-flight option provided for AMA events). VOUCHER PROCESSING will be used for all stages—Qualifying Trials, Semi-Finals, Team Finals; forms may be obtained upon request with program entry, or vouchers from previous progams may be used. Note that vouchers are a convenience to meet CD's, not a guarantee that model meets the required specifications.

Eligibility

The program is open to any AMA member who has the current FAI stamp (obtainable from AMA HQ for $1 extra if purchased when dues are paid, $1.25 if purchased later). Program entry fees (see below) must be paid prior to flying; initial qualifying entry fee (either in advance to AMA HQ or on-site at an AMA sanctioned Class A Qualifying Trials) entitles flyer to unlimited attempts at qualification during the time period allowed, April 1 to July 29, 1973—also at the 1973 Nats.

Program Entry

Entry in the Qualifying Trials stage of the program is made in one of two ways:

1. IN ADVANCE (preferable) by Senior and Open AMA members sending to AMA HQ a program fee of $4.00 for each event to be entered. Entry is free for Junior members (but they must request entry from AMA HQ, and include a stamped, self-addressed return envelope). All program entry fees (and entry requests by Juniors) must be accompanied by the flyer's name, address, AMA number and type of event(s) to be flown (specify Wake, Power and/or Nordic).

2. AT AN AMA SANCTIONED FAI FF QUALIFYING TRIAL, by Senior and Open AMA members paying to the Contest Director a late program fee of $5.00 for each event. There is no late fee for Juniors.

How to Qualify

Qualification for the Semi-Final stage of the program may be done at either a regularly scheduled AMA FF meet with FAI events or at an AMA Class A Qualifying Trial (see Contest Calendar for dates, sites). Note that qualifying at a regularly scheduled AMA meet requires advance entry by mail to AMA HQ as on-site entry is not available; also, permission must be obtained in advance from the meet CD to fly seven flights. Qualifying and late entry as per 2 will be permitted at the Nats. Qualifying must be done between April 1 and July 29, 1973, except that solely in the case of the Nats, qualifying may be accomplished later.

Qualifying Criteria

Qualifying performance needed to advance to the Semi-Final stage of the program is a 7-flight (or less) total of 14 minutes or better, with model specifications and timing in accordance with FAI rules. When a flyer succeeds in qualifying, the meet CD will certify to this by signing the flyer's Qualification Performance Affidavit. Affidavit forms are provided to the program entrant by AMA HQ when entry is in advance as per 1 or by the meet CD when entry is at a Qualifying Trial as per 2. Once qualified, the flyer (not the CD) will mail one copy of the Affidavit to the Program Administrator, one copy to AMA HQ, and keep the other copy as his receipt.

Semi-Final Trials

Such regional events are to be held over the three-day Labor Day week end of 1973, tentatively at the following locations: Galeville, N.Y.; Bong, Wisc.; Tulsa, Okla.; Denver, Colo.; Taft, Calif.; Tacoma, Wash.; Tullahoma, Tenn. Each Semi-Final will consist of

Two of the three types of FF models involved in the current team program: Nordic A-2 (Top) and Wakefield Rubber (Above). The third type is FAI Power. Samuel Bridges and George Rivers are preping the Nordic Glider while Robert Loeffler checks his Wakefield's wing alignment.

flying all three events simultaneously with 5 rounds each day for three days (15 flights total). Semi-Final entry fees per event: $5 for Opens and Seniors, $2 for Juniors.

The number of Semi-Finalists at each location to be eligible for advancement to the Team Finals will be determined by the formula, N = L/C x K, where N equals the number of flyers advanced (rounded to the nearest whole number), L equals the number of flyers in an event at one Semi-Final, C equals the number of flyers in that event in the country at all Semi-Finals, and K equals 30 (a constant to result in a manageable number of Team Finalists).

At least one flyer will advance in each event from each Semi-Final regardless of the number of entrants. Also, anyone making at least 95% of the winning time will be advanced.

Team Finals

The concluding competition of the FF Team Selection Program will be held over the three-day Labor Day weekend of 1974 at a single site, most likely Taft, Calif. To be admitted to the Team Finals are the Semi-Final qualifiers as indicated above, and also the members of the 1973 U.S. FF teams (but only for events in which they were team members; for other events they must enter and qualify in the Qualifying Trials and Semi-Finals). Team Finals entry fee is $12 per event for all finalists.

One team member for each event will be determined on each of the three Team Finals days. Each day's flying will consist of five rounds, plus flyoff rounds as required, and the top man in each event on each day will become a team member. This procedure will be repeated on the 2nd and 3rd days, resulting in the selection of three team members for each event to represent the U.S. in the 1975 Free Flight World Championships.

SECOND-CHANCE. There will be "second chance trials" during the first day of the Team Finals for flyers who did not qualify at a regional Semi-Final. To be eligible to enter the "second-chance trials" a flyer must have flown at a regional Semi-Final; he must travel to the Team Finals at his own expense (no travel expense reimbursement will be paid to him), and he must pay the $12 Team Finals entry fee. He will fly with the Team Finalists during the first day's competition, and if he equals or betters the third place flight time he will then be permitted to fly in the second and third day competitions with other Team Finalists for possible team membership; a "second-chancer" who has top time on the first day of the Team Finals does not by so doing become a team member—on the first day he can only qualify to compete on the 2nd and 3rd days.

TRAVEL REIMBURSEMENT. All money collected as entry fees in the program will be distributed to the Team Finalists for travel expenses. (Such fees will not be used to cover any other program or meet expenses.) The details of the distribution system will be determined by the program administrator with the approval of the AMA president, but the method used must be based solely on the distance traveled, and there will be no reimbursement to any Team Finalist for the first 500 miles he must travel.

Time for AMA Officer Nomination

The AMA Nominating Committee plans to meet during the 1973 National Model Airplane Championships. Between now and when the committee meets is the time for submitting names of candidate nominations for vacancies to be caused by expiring terms at the end of 1973. Such vacancies will be filled by an election later this year, the victors to be in office during the 1974-75 term.

Up for nomination this year is the national position of AMA Secretary-Treasurer and regional Vice-President positions for Districts I, III, V, VII, IX and XI. See the AMA officer directory in the May issue of AAM (page 110) for a map of AMA districts and also a listing of current AMA officers.

Those officers to be elected comprise about half of the Executive Council, AMA's "board of directors." This is the body which establishes AMA policies and, in general, controls the destiny of AMA; thus it is extremely important for the very best people to be chosen—beginning with nomination.

NOMINATION PROCEDURE. As per guidelines currently in effect it is required that any candidate for national office (president or secretary-treasurer) must have served, or shall be currently serving, as either: elected officers of the AMA (such as vice-president) or as officers appointed by the president or the vice-presidents (such as Contest Board members, associate vice-presidents or committee chairmen). Also, it is required that a candidate be a Leader member (or Contest Director) of the AMA. For elected district officers (vice-presidents) the same requirements are applicable, or either of two others may be substituted: Leader members recommended by vote of an AMA chartered club, or by a current Contest Director.

Names of all qualified candidates must be submitted in writing prior to the start of the Nominating Committee meeting. (These procedures must also be followed for re-nomination of current officers, if desired, as their names are not automatically placed on the ballot.) All such names will be considered by the committee, but only two names per office will be approved by the committee for listing on the ballot. However, the ballot will provide for write-in votes for any additional candidates who meet the requirements. Candidates are also urged to submit in advance, to the committee, any statements, documents or evidence supporting their nomination. Note: the Nominating Committee is made up of the elected district vice-presidents or their designated representatives.

Nominations may be submitted by any AMA member, in writing with a statement of at least 100 words concerning the candidate's qualifications, to the member's district vice-president, with a copy to AMA HQ. Consent of the person named should be obtained prior to submission.

This announcement is published at least 90 days prior to the annual Nominating Committee Meeting in accordance with the Nominating Procedures Document provided for by the AMA by-laws.

First RC Flight

George Barry (AMA 54429) says that most beginning flyers come to the LIDS field thinking their airplanes are ready for flight, only for a club senior pilot or instructor to find that the airplanes have one or more "troubles" which delay or prevent their being flown. This information came from the LIDS Flyer, newsletter of the AMA chartered Long Island Drone Society edited by Scott McAfee (AMA 72008).

But the fact that the club has a senior pilot and instructors is important, for the beginning flyers referred to obviously didn't realize that everything wasn't right—preventing many a crash. And this points to the need for starting pilots to get with others who have experience, as in an AMA chartered club, to avoid the pitfalls which may plague the loner.

How do you locate the nearest club? The AMA annually publishes a directory of AMA chartered clubs in this section; the most recent was in the March and April 1973 issues. Also, a request to AMA HQ accompanied by a

Beautiful RC Scale Hawker Hunter by Bob Campbell. As inspiring as they are, Scale models are generally not recommended for starting out in RC. Other types are more forgiving.

pre-addressed stamped (8 cent) envelope will obtain a current list of AMA chartered clubs for your state. Another source for locating the nearest club is your local hobby shop.

Back to George Barry, he lists more than 20 different faults common to some of the beginning RC'ers at the LIDS field. Check the items which follow; if your plane and equipment have none of these problems, then you are well on your way to a successful flying session.

Wrong type of plane on which to learn (ask club instructor for correct type before purchase). Poor radio range. Airplane not in proper balance. Engine that won't idle. Idle not trimmed so engine can be shut off. Not enough rubber bands holding on wing. Insufficient throw in controls. Too much throw in controls.

Poor hinge installation. Improper push-rod installation (loose and excessive bends). Loose servo installation. Wrong propeller for engine and plane. Metal-to-metal contacts. Loose muffler. Loose engine. Loose motor mount. Wrong fuel feed level. Wrong mounting hardware (particularly engine mounts). No keepers on push-rod links.

Insufficient knowledge of how to properly: start engine, break-in engine, tune engine, check plug, range check radio system. Inability to hand-start engine (electric starter recommended for most beginners with .60 engines). Dead batteries. Insufficient peripheral equipment. Not enough correct propellers (estimate one prop per landing at the beginning). Old fuel.

As for the radio system itself, Barry recommends that second-hand equipment must be inspected and checked by the manufacturer (or someone of known competence) or else be avoided. And the buyer of new equipment might benefit from first checking with club instructors (even though, as he indicates, most radio systems are good).

"Take pride in your investment," is Barry's important parting recommendation. "Neatness does count, inside and out. While it is not necessary to fall in love with every airplane you build, look around and see what some of the neat builders are doing. Take a tip from them. Do it right the first time, and it should give you many good flying hours of enjoyment."

If You Need to File an AMA Insurance Claim

If you carry homeowner's (household) insurance, your local agent for this coverage should be advised of any claim involving a model flying accident. Since AMA's insurance is secondary to any other coverage, status of the latter must be determined first. If it should be resolved that homeowner's or other liability insurance does not apply, a statement to that effect should then be given to the local representative of the AMA's insurance company (Hartford Accident & Indemnity Company), or sent to AMA Headquarters. (The local contact is better as it can save time, but either is satisfactory.)

Please keep in mind that the question of other coverage must be answered first. Failure to take care of this can result in delay and discouragement. On the other hand a prompt settlement of this point will resolve the whole question of insurance coverage more quickly —whether by your insurance company or AMA's.

We would like very much to not have to bother with the 'other insurance' problem, but the cost is prohibitive. AMA's insurance is considerably less expensive than it might be due to its secondary coverage basis. Also, it helps to improve model aviation's insurance claim record—spreading any such claims over several companies prevents any one from showing too great a risk situation.

The end result is more efficient use of your money. If there is no other coverage, the AMA insurance applies directly. If there is other coverage, the payments from this help to hold down the cost of AMA membership. In either case insurance coverage is available. Furthermore, while most homeowner's coverage is subject to a $25,000 or $50,000 limit, AMA's coverage increases this to $1,000,000 additional (this is new, effective March 1—previously was $300,000). Thus if the homeowner's is insufficient to cover a claim, the AMA coverage will take over where homeowner's coverage ends.

In any case, please realize that liability insurance involves different problems from that of accident or hospitalization type coverage. As a result there may be delays which seem excessive, but which are necessary to provide detailed claim investigation. Your patience will be appreciated and helpful, particularly if the question of other insurance must be resolved first. In the meantime, please be assured that AMA's insurance DOES provide protection. An average year shows about 50 claims. Names of AMA members who have received claim settlements are available from AMA HQ upon request. AMA has provided insurance coverage since 1942—over thirty years of service.

Officer Directory Changes

The AMA officer directory published in the May AAM, page 110, already has had a few revisions, as follows.

Dist. VI: Bob Vojslavek, 7819 Chestnut Ave., Woodridge, Ill. 60515, has been appointed Associate Vice-President.

Dist. VII: Earl Pell, 907 Medford Ct., Rochester, Mich. 48063, has been named to the Soaring Advisory Council.

Dist. VIII: Calvin Scully, 5271 Memorial Dr., Houston, Tex. 77007, has been appointed as RC Contest Board member in place of Ted White, who has moved from the district.

Dist. VIII CL Meeting

V.P. Murry Frank announces that he is organizing a Control Line Meeting on June 16 at Ft. Worth in conjunction with the Cowtown Circle Burners' Contest. All AMA members invited.

Official Sanctioned Contests of the Academy of Model Aeronautics

MAY 5—BOWMAN, S.C. (AA) Wingbusters 1st Annual Spring CL Meet. Site: Bowman. L. Gentry CD, 377 Scoville Rd., Orangeburg, S.C. 29115. Sponsor: Wingbusters.

MAY 5-6—MONROE, N.C. (AA) MR/CC RC Air Races. Site: Monroe. B. Helms CD, 800 Tyvola Rd., Charlotte, N.C. 28210. Sponsor: Monroe RC Club.

MAY 5-6—WOODLAND, CALIF. (AA) West Coast RC Invitational Pattern Meet. Site: Yolo County Airport. R. Knowles CD, 255 Berryessa Dr., Vacaville, Calif. 95688. Sponsor: Woodland RC Club.

MAY 5-6—ZILLAH, WASH. Aero Modelers RC Fun Fly. Site: Rashfords Airstrip. B. Tucker CD, Box 167, Zillah, Wash. 98953. Sponsor: Valley Aero Modelers.

MAY 5-6—TAFT, CALIF. (AA) SHOC Annual Cat. I FF Meet. Site: Taft. M. Schmidt CD, 1140 Sturbridge, La Habra, Calif. 90631. Sponsor: Sky Hoppers of Orange County.

MAY 5-6—WACO, TEX. (AA) The 2nd Texas Open RC Contest. Site: Waco. M. Blose CD, Box 544, Hamilton, Tex. 76531. Sponsor: H.O.T.M.A.C.

MAY 5-6—HUNTSVILLE, ALA. (AA) 13th Annual Rocket City RC Meet. Site: Old Huntsville Airport. C. Scholefield CD, 2709 Briarwood Dr., S.E., Huntsville, Ala. 35801.

MAY 6—MESQUITE, TEX. (AA) 15th Annual Mother's Day FF Contest (Cat. II). Site: Samuels East Park. J. McDonald CD, 2523 Greenport, Dallas, Tex. 75228.

MAY 6—FRANKTON, IND. (A) 5th Annual Madison County Fun Fly. Site: Frankton. J. Payton CD, 601 W. Washington, Alexandria, Ind. 46001. Sponsor: Madison County RC Flyers.

MAY 6—WYCKOFF, N.J. (A) N.J.R.C.C. Spring RC Warmup Meet. Site: Wyckoff, J. Beshar CD, 198 Merritt Dr., Oradell, N.J. 07649. Sponsor: North Jersey RC Club.

MAY 6—WICHITA, KANS. (AAA) Wichihawks Sixth Annual Spring FF (Cat. II) & CL Rally. Site: 15th & Webb. M. Tallman CD, 3014 Exchange, Wichita, Kans. 67217. Sponsor: Wichihawks.

MAY 6—RICHMOND, VA. (AA) Brainbusters Spring FF (Cat. II) Meet. Site: Curles Neck. A. VanDover CD, 112 Tillerson Dr., Newport News, Va. 23602. Sponsor: Brainbusters M.A.C.

MAY 6—EAST MEADOW, N.Y. (AA) LIAMAC/A & S Aeromodeling CL Championships. Site: Eisenhower Park. J. Pallet CD, 30 Emerson Rd., Brookville, L.I., N.Y. 11545.

MAY 6—DAYTON, OHIO (AA) Dayton Buzzin Buzzards Early Bird CL Fly-In. Site: Public Flying Field. W. Keller CD, 1340 Mintwood Dr., Centerville, Ohio 45459. Sponsor: Dayton Buzzin Buzzards.

MAY 6—WASHINGTON, D.C. (A) Spring CL Novice Stunt & Slow Combat Meet. Site: Anacostia Naval Air Station. K. Curtis CD, 9751 Goodluck Rd., No. 1, Seabrook, Md. 20801. Sponsor: Sky Lancers of Washington, D.C.

MAY 6—HADLEY, MASS. (A) Hampshire County Grand Prix RC Air Races. Site: Hadley. J. Papageorge CD, 104 Rockey Hill Rd., Hadley, Mass. 01035. Sponsor: Hampshire County Radio Controllers.

MAY 12-13—AUGUSTA, GA. (AA) C.S.R.A. 3rd Annual RC Jamboree. Site: Club Flying Field. L. Nash CD, 403 Lavista Pl., Pendleton, S.C. 29670. Sponsor: C.S.R.A. Flyers.

MAY 12-13—CLOVIS, N. MEX. (AA) Annual RC Fun Fly & Contest. Site: MADS Field. C. Meyer CD, 1508 Westchester, Clovis, N. Mex. 88101. Sponsor: Clovis M.A.D.S.

MAY 12-13—HOUSTON, TEX. (AA) Space City Aerobatic RC Rendezous. Site: Manned Spacecraft Center. O. Morris CD, 130 Driftwood, Seabrook, Tex. 77586. Sponsor: Manned Spacecraft Center RC Club.

MAY 12-13—BURLINGTON, N.C. '9A) Central Carolina RC Meet—4th Annual. Site: Burlington. H. Randies CD, 3016 Marlborough Rd., Burlington, N.C. 27215. Sponsor: Greenboro Radio Modelers.

MAY 13—MULBERRY, FLA. (A) All Florida RC Soar-In. Site: Imperial RC Club Field. R. Meland CD, P.O. Box 886, Lakeland, Fla. 33803. Sponsor: Imperial RC Club.

MAY 13—COLUMBUS, OHIO (AA) Carrier-Combat CL Meet. Site: Columbus. F. Miller CD, 1313 Brookridge Dr., Columbus, Ohio 43220. Sponsor: N.R. Aeromodelers.

MAY 13—RICE LAKE, WISC. (A) Hawk's First FF (Cat. II) Contest. Site: Barron County Campus. F. Kelley CD, 20 Phipps Ave., Rice Lake, Wisc. 54868. Sponsor: Hard-scrabble Hawks Model Airplane Club.

MAY 13—LAKEHURST, N.J. (A) 3rd Annual A/B RC Pattern Meet. Site: Lakehurst N.A.S. D. Sarpolus CD, 32 Alameda Ct., Shewsbury, N.J. 07701. Sponsor: Monmouth Model Airplane Club.

MAY 19—HILLSBORO, ORE. FAI Quarter Final Qualifying FF Meet. Site: Hillsboro Field. R. Waterman CD, 1520 NW 131st St., Portland, Ore. 97229.

MAY 19-20—AMARILLO, TEX. ARKS Spring Fly-In. Site: S.E. Park. B. Irwin CD, 3302 Lewis Ln., Amarillo, Tex. 79109. Sponsor: Amarillo RK Society.

MAY 19-20—SUMTER, S.C. Iris Festival Fly-In. Site: Sumter County Airport. J. Agee CD, 584 B White Oak, Shaw A.F.B., S.C. Sponsor: Sumter Model Airplane Club.

MAY 19-20—BOWIE, MD. (AAA) Maryland State RC Championships. Site: Bowie Airpark. J. Haumersen CD, 7718 Jaffrey Rd., Oxon Hill, Md. 20022. Sponsor: Prince Georges RC Club.

MAY 19-20—HARVEY, ILL. (A) 11th Annual RC Season Opener. Site: Kikapoo Woods. A. Szymkowski CD, 14220 LaSalle, Riverdale, Ill. 60627. Sponsor: Radio Control Club of Chicago.

MAY 19-20—JACKSONVILLE, FLA. (AAA) 1973 FF, CL & RC Rebel Ralley (Cat. II). Site: Whitehouse N.A.S. F. Carney CD, 1839 Loyola Dr., Jacksonville, Fla. 32218.

MAY 19-20—ROUGH RIVER, KY. (AA) Kentucky's 1st Annual "Mint Julep" RC Meet. Site: Rough River Landing Strip. D. Early CD, 4505 Crator Dr., Louisville, Ky. 40229.

MAY 19-20—LAFAYETTE, LA. (AA) 5th

Annual Model Aviation RC Day. Site: Stutes Field. G. Myers CD, 204 Montgomery Dr., Lafayette, La. 70501. Sponsor: Acadian RC Club.

MAY 19-20—TUCSON, ARIZ. (AA) Cholla Choppers MAC Spring CL Invitational. Site: Rodeo Park. C. Dierdorf CD, 2242 Monterey Vista, Tucson, Ariz. 85713. Sponsor: Cholla Choppers M.A.C.

MAY 19-20—FOUNTAIN VALLEY, CALIF. (A) Valley Flyers RC Air Races. Site: Mile Square. C. Smith CD, 8509 Lennox Ave., Panorama City, Calif. 91402. Sponsor: San Fernando Valley RC Flyers.

MAY 20—YPSILANTI, MICH. (A) Signal Seekers 1/4 RC Midget Races. Site: Ypsilanti. P. Waters CD, 31219 Kendall, Livonia, Mich. 48154. Sponsor: Signal Seekers RC Club.

MAY 20—FRESNO, CALIF. (A) F.G. M.C. Monthly FF (Cat. I) Meet. Site: Ave. 12, Road 37 1/2. F. Ginder, Jr. CD, 5740 E. Ashlan Ave., Fresno, Calif. 93727. Sponsor: Fresno Gas Model Club.

MAY 20—MILLVILLE, N.J. (A) S. Jersey Aeromodelers CL Meet. Site: Millville Airport. K. Andrews CD, Rd. 3, Box 260, Millville, N.J. 08332. Sponsor: South Jersey Aeromodelers.

MAY 20—LAKEHURST, N.J. (A) Quarter Midget RC Pylon Race. Site: Lakehurst N.A.S. E. Weiss, CD, 276 Michael Ave., Elbeson Park, N.J. 07750. Sponsor: Monmouth Model Airplane Club.

MAY 20—NEWCASTLE, PA. P.O.R.K.S. Annual RC Fun Fly. Site: Oesterling Flying Field. W. Henderson CD, 202 Williams Rd., Butler, Penna. 16001. Sponsor: Penn Ohio Radio Kontrol Society.

MAY 20—LOMBARD, ILL. (AAA) Treetown 7th Regional CL Championships. Site: Yorktown Shopping Center. J. Tulach CD, 2247 Belleview Ave., Westchester, Ill. 60153. Sponsor: Treetown Modelaires.

MAY 20—BLAINE, MINN. (AA) Annual Spring FF (Cat. II) Meet. Site: Hentges Sod Farm. D. Monson CD, 131 W. Wentworth, W. St. Paul, Minn. 55118. Sponsor: Minneapolis Model Aero Club.

MAY 20—PHOENIX, ARIZ. Class I Record Trials. Site: 35th & Pinnacle Peak Rds. R. Gudahl CD, 615 E. Winter Dr., Phoenix, Ariz. 85020.

MAY 20—OKLAHOMA CITY, OKLA. (A) TORKS Spring RC Pylon Meet. Site: TORKS Field. R. Freeland, Jr. CD, 7308 N. Western, Oklahoma City, Okla. 73116.

MAY 20—MIAMI, FLA. (AA) Dade Park & Recreation Dept. Indoor Contest (Cat. I). Site: Youth Fair. B. Myers CD, 3935 SW 125th Ave., Miami, Fla. 33165. Sponsor: M.I.A.M.A. Club.

MAY 20—GLASTONBURY, CONN. SAM-7 Spring FF Rally. Site: Meadow Road. J. Whittles CD, 43 Farview Ave., Saybrook, Conn. 06475. Sponsor: Society of Antique Modelers Chapter 7.

MAY 20—MESQUITE, TEX. (A) The RC Glider Gaggle I. Site: Samuels East Park. L. Dierolf CD, 207 Leda Dr., Mesquite, Tex. 75218. Sponsor: Dallas RC Club.

MAY 20—MUSCATINE, IOWA (A) MMAA RC Pylon Race. Site: Clarence Harper Farm. H. Pohlmann CD, 720 S. Ohio, Davenport, Iowa 52802. Sponsor: Muscatine Miniature Aircraft Assn.

MAY 20—CLEVELAND, OHIO (B) Aero Club Meet. Site: Cleveland Airport. R. Tegel CD, 452 E. 329, Cleveland, Ohio 44094. Sponsor: Propbusters M.A.C.

MAY 20—BALTIMORE, MD. (AA) 7th Annual CL Combat Contest. Site: Skyview Park. L. Lauer CD, 831 Lannerton Rd., Baltimore, Md. 21220. Sponsor: Flite Streaks.

MAY 20—ST. LOUIS, MO. Signal Chasers Fly for Fun. Site: Buder Park. M. Hart CD, 936 Dontaos, St. Louis, Mo. 63131. Sponsor: Signal Chasers RC.

MAY 20—HILLSBORO, ORE. (A) 3rd Annual Nor'Westers O.T. FF (Cat. I) Meet. Site: Hillsboro. J. Anderson CD, 1495 NW 136th, Portland, Ore. 97229. Sponsor: Nor' Westers M.A.C.

MAY 20—ORWELL, OHIO (AA) 1st Annual FF Spring Thing. Site: Champion Field. J. Peters CD, 315 Bradford Dr., Canfield, Ohio 44406. Sponsor: Ohio Flying Aces.

MAY 20—BRIDGEWATER, MASS. RC Fun Fly. Site: Bridgewater. E. Thompson CD, 57 Rathrun St., Conventry, Mass. 02816. Sponsor: South Shore RC Club.

MAY 20—ONTARIO, CANADA (AA) U/P.R.C. United Pylon Racing Circuit RC Meet. Site: Waterford. H. deBolt CD, 49 Colden Ct., Buffalo, N.Y. 14225. Sponsor: Niagara County RC Model Airplane Club, Inc.

MAY 20—FREMONT, NEBR. (A) 2nd Annual Fun Fly. Site: Frontier Flyers Field. L. Austin CD 1711 N. Broad St., Fremont, Nebr. 68025. Sponsor: Frontier Flyers, Inc.

MAY 26-27—FT. LEE, VA. (AA) Mid-Virginia Spring RC Classic. Site: Ft. Lee. F. Gregg CD, 12709 Richmond St., Chester, Va. 23831. Sponsor: Mid-Virginia RC Club.

MAY 26-27—KINGSVILLE, TEX. (AAA) 4th Annual Navy Regional CL & RC Model Airplane Championships. Site: Kingsville N.A.S. R. Olen CD, P.O. Box 1118, Kingsville, Tex. 78363. Sponsor: Kingsville Aeromodelers Soc.

MAY 26-27—KANSAS CITY, MO. (AAA) Royal Midwestern CL Championships. Site: Swope Park. B. Wright CD, 2818 Collin, Independence, Mo. 64052. Sponsor: Mo-Kan Modelers Assn.

MAY 26-27—SCHENECTADY, N.Y. (AA) Empire State RC Championships. Site: Schenectady County Airport. A. Sattler CD, 29 Waldorf Pl., Schenectady, N.Y. 12307. Sponsor: Thundervolts RC Club, Inc.

MAY 26-27—TULLAHOMA, TENN. (A) Coffee Airfoilers RC Thermal Soaring Meet. Site: Tullahoma. C. Tuthill CD, 101 Westwood Dr., Tullahoma, Tenn. 37388. Sponsor: Coffee Airfoilers.

MAY 26-27—SPOKANE, WASH. (A) Memorial Day RC Glider Meet. Site: ARCS Field. G. Michelson CD, N6616 Nevada Sp. 37, Spokane, Wash. 99208.

MAY 26-27—LENEXA, KANS. (AA) Shawnee Mission RC Annual Contest. Site: Shawnee Mission Park. S. Rice CD, 600 Richards Dr., Shawnee Mission, Kans. 66216. Sponsor: Shawnee Mission RC Club.

MAY 26-27—GRAND JUCTION, COLO. (AAA) Memorial Day Annual FF & CL Meet. Site: Modeleers Field. P. Neilsen CD, 2104 Gunnison Ave., Grand Junction, Colo. 81501.

MAY 26-27—EUGENE, ORE. (AAA) Northwest Regional CL Championships. Site: Eugene. M. Gilbert CD, 170 Formac, Eugene, Ore. 97402. Sponsor: Eugene Prop Spinners.

MAY 26-28—COUNCIL BLUFFS, IOWA National Falcon Tournament. Site: Cobras Field. J. Simpson CD, 2736 Ellsworth, Omaha, Nebr. 68123.

MAY 27—OKLAHOMA CITY, OKLA. (AA) Central Oklahoma CL Championships. Site: 5300 Broadway Ext. M. McGee CD, 904 N. Harris, Apt. A, Oklahoma City, Okla. 73107. Sponsor: Oklahoma City Controliners.

MAY 27—CHARDON, OHIO (AA) C.R.C. 11th Annual RC Pattern Event. Site: Chardon. F. Sheplavy CD, 36981 S. Lakeshore Blvd., Eastlake, Ohio 44094.

MAY 27—FT. WORTH, TEX. (A) Formula I RC Pylon Race. Site: Thunderbird Field. E. Slaughter CD, 2202 Jacocks Ln., Ft. Worth, Tex. 76115.

MAY 27—DOWNERS GROVE, ILL. (AAA) 3rd Annual CL "Memorial Classic." Site: DG South High School. R. Vojslavek CD, 7819 Chestnut Ave., Woodridge, Ill. 60515.

MAY 27—CHAGRIN FALLS, OHIO (AA) 9th Annual Erie Model Aircraft Assn. Old Timer FF Contest. Site: Savage Road. V. Didelot CD, 4410 Lorna Ln., Erie, Penna. 16506. Sponsor: Erie Model Aircraft Assn.

MAY 27—NEW ORLEANS, LA. 1st Pelican CL & RC Fun Fly. Site: Joe Brown Park. A. DeVoney CD, 7136 Thornley Dr., New Orleans, La. 70126. Sponsor: Orlean East Flying Club.

MAY 27—MAYWOOD, ILL. (A) RC Pylon Racing Meet. Site: Maywood. R. Piorek CD, 823 N. Lombard Ave., Oak Park, Ill. 60302. Sponsor: Checkerboard RC Club & Chicago Pylon Club.

MAY 28—UNION, N.J. (AAA) 19th Union CL Model Airplane Invitational. Site: Morrison Field. W. Staubach CD, 158 Washington Ave., Elizabeth, N.J. 07202.

JUNE 2-3—BATON ROUGE, LA. (AA) RC "Cajun Classic." Site: Kleinpeter Field. H. Roberts CD, 9243 Hampton Way, Baton Rouge, La. 70814.

JUNE 2-3—MESQUITE, TEX. (AA) Dallas RC Club 19th Annual RC Meet. Site: Samuels East Park. D. Brown CD, 930 Vinecrest Ln., Richardson, Tex. 75080.

JUNE 2-3—VALLEY PARK, MO. (AAA) Gateway FF, Ind., CL and RC Championships. Site: Buder Park. R. Underwood CD, 4109 Concord Oaks Dr., St. Louis, Mo. 63128.

JUNE 2-3—LUBBOCK, TEX. SPARKS Annual Fun Fly. Site: SPARKS Field. J. Parkam CD, 102 McGuire St., Reese Village, Tex. 79416. Sponsor: SPARKS.

JUNE 2-3—LINCOLN, NEBR. (AA) Lincoln Sky Knights 14th Annual RC Meet. Site: 33rd & Superior. G. Chisholm CD, 1027 Stuart Blvd., Lincoln, Nebr. 68508. Sponsor: Lincoln Sky Knights.

JUNE 2-3—SHREVEPORT, LA. (AAA) 10th Annual Louisiana State CL Championships. Site: Skydemon Hobby Park. H. Hunton CD, 9529 Pitch Pine, Shreveport, La. 71108.

JUNE 2-3—BROCKPORT, N.Y. (AA) 14th Annual N.Y. State RC Championships. Site: Brockport. T. Salvemini, Sr. CD, 6 Valley Ln., Avon, N.Y. 14414. Sponsor: Radio Control Club of Rochester.

JUNE 3—GLASTONBURY, CONN. (A) Flying Aces Club Spring Meet. Site: Glastonbury. R. Thompson CD, Hat Shop Hill, Bridgewater, Conn. 06752. Sponsor: Flying Aces Club.

JUNE 3—SHOREVIEW, MINN. (A) 1st Annual North Central RC Pylon Meet. Site: Shoreview. D. Granlund CD, 7213 Oliver Ave., N., Brooklyn Center, Minn. 55430.

JUNE 3—LANCASTER, OHIO (A) F.O.R.K.S. RC Pylon Day. Site: FORKS Field. J. Slater CD, 809 Forest Rose Ave., Lancaster, Ohio 43130. Sponsor: Fairfield Ohio Radio Kontrol Society.

JUNE 3—DETROIT, MICH. (AA) Great Lakes CL Internationals. Site: Rouge Park. A. Adamisin CD, 22454 Fairfax, Taylor, Mich. 48180. Sponsor: Strathmoor Model Club of Detroit.

JUNE 3—DAYTON, OHIO (AA) Dayton Early Season Super Spectacular CL Meet. Site: Dayton Municipal Flying Circles. K. Trostle CD, 6301 Leawood Dr., Dayton, Ohio 45424. Sponsor: Dayton Buzzin Buzzards.

JUNE 3—JAMESBURG, N.J. (A) Tri-County RC Internationals. Site: Tomson Park. A. Eck CD, 361 Main St., Spotswood, N.J. 08884. Sponsor: Tri-County Radio Control Club.

JUNE 3—ELLINWOOD, KANS. (A) Continental Pattern CL Meet. Site: Ellinwood. W. Mowrey CD, Rt. 2, Box 56, Kinsley, Kans. 67547. Sponsor: The Kansas Sunflyers Model Club.

JUNE 3—BRISTOL, CONN. (AA) Model Classic CL Meet. Site: Edgewood School. J. Scott Jr. CD, 265 Witches Rock Rd., Bristol, Conn. 06010. Sponsor: Hornets M.A.C.

JUNE 3—PASADENA, TEX. Red Barrons Fun Fly. Site: Red Barrons Flying Field. W. Beckham CD, 806 Grove Ave., Deer Park, Tex. 77536. Sponsor: Gulf Coast RC Club.

JUNE 3—NASSAU COUNTY, N.Y. (A) Long Island Drone Society Annual RC Pylon Meet. Site: Mitchell Field. T. Felco CD, 3989 Florence Rd., Seaford, N.Y. 11783. Sponsor: Long Island Drone Society.

JUNE 3—COLORADO SPRINGS, COLO. (A) 9th Annual Pikes Peak Fun Fly. Site: Colorado Springs. G. Hayhurst CD, 1219 Oswego, Colorado Springs, Colo. 80904. Sponsor: Pikes Peak RC Club.

JUNE 9—FT. SILL, OKLA. (A) LAFF'S 1st RC Sailplane Meet. Site: Gate No. 4, Laff's Field. J. Spoka CD, 4509 Cherokee Ave., Lawton, Okla. 73501. Sponsor: Lawton Area Fun Flyers.

JUNE 9-10—HOUSTON, TEX. (AA) Houston RC Club Annual RC AA Contest. Site: Houston RC Field. B. Striegler CD, 5831 McKnight, Houston, Tex. 77035. Sponsor: Houston RC Club.

JUNE 9-10—KANSAS CITY, MO. (AA) KC/RC Annual RC Meet. Site: Lake Jacomo. K. Borgman CD, 9700 E. 82nd, Raytown, Mo. 64138. Sponsor: Kansas City RC Assn.

JUNE 9-10—WARREN, OHIO RC Fun Fly Nationals. Site: Kent State University. R. Plant CD, 550 Freeman St., Warren, Ohio 44483. Sponsor: T.C.R.C.M.

JUNE 9-10—ELK GROVE VILLAGE, ILL. (A) Chicagoland 25th Anniversary RC Contest. Site: C.R.C.M. Field. D. Wehrheim CD, 1438 Linden Rd., Spring Grove, Ill. 60081. Sponsor: Chicagoland RC Modelers.

JUNE 9-10—CHESAPEAKE, VA. (AA) TRC 7th Annual AA RC Meet. Site: Fentress Air Field. L. Woolard CD, 301 Haledon Rd., Chesapeake, Va. 23320. Sponsor: Tidewater RC Club.

JUNE 10—ENDICOTT, N.Y. (AA) 8th Annual Aeroguidance Society RC Meet. Site: Tri-Cities Airport. W. Johnson CD, 833 W. Circle Dr., Vestal, N.Y. 13850. Sponsor: Aeroguidance Society, Inc.

JUNE 10—COUNCIL BLUFFS, IOWA (AAA) 10th Annual Midwest CL Model Meet. Site: Iowa School for Deaf. D. Hutcheson CD, 317 Spencer Ave., Council Bluffs, Iowa 51501. Sponsor: Baisa Busters.

JUNE 10—CHICAGO, ILL. (AAA) Aero Angels Annual CL Meet. Site: Forest Preserve. D. Buker CD, 4337 N. Osceola, Norridge, Ill. 60634. Sponsor: Aero Angels, Inc.

JUNE 10—QUEENS, N.Y. (AAA) Forest Park 5th Annual CL Contest. Site: Flushing Meadow Park. R. Moore CD, 128 N. Elm St., N. Massepequa, N.Y. 11758.

JUNE 10—VALKARIA, FLA. FMPRA RC Meet. Site: Valkaria. M. Holland CD, 1201 Willowbrook Tr., Maitland, Fla. 32751. Sponsor: R.C.A.C.F.

JUNE 10—YOUNGSTOWN, OHIO (A) 4th Annual CL Combat "Smasher" Site: Austintown Park J. Peters CD, 315 Bradford Dr., Canfield, Ohio 44406. Sponsor: Ohio Flying Aces.

JUNE 16-17—DELAVAN, ILL. (AA) Golden Age of Flight CL & RC Meet. Site: Delavan. D. Shipton CD, RR No. 2, Box 68, Delavan, Ill. 61734.

JUNE 16-17—DENVER, COLO. (AA) 15th Annual Mile-Hi RC Meet. Site: Lowry A.F.B. H. Geller CD, 6920 E. Exposition, Denver, Colo. 80222. Sponsor: Mile-Hi RC Club.

JUNE 16-17—MESQUITE, TEX. (AA) 4th Annual CMC FF Championships (Cat. II). Site: Samuels East Park. D. Horn CD, 5956 Burgandy, Dallas, Tex. 75230. Sponsor: Cliff Cloud Climbers of Dallas

JUNE 16-17—PENSACOLA, FLA. (A) Fiesta of Five Flags Southeastern CL & RC Model Meet. Site: NCTC Corry Field. R. Fritz CD, 1005 Revere Dr., Pensacola, Fla. 32505. Sponsor: Pensacola Aeromodelers.

JUNE 16-17—RIDGEFIELD, CONN. (AAA) Eastern RC Aerobatic RC Championships. Site: Richardson Field. R. Noll CD, 8 Seneca Rd., Danbury, Conn. 06810. Sponsor: Fairfield League of Yankee Radio Controllers, Inc.

JUNE 17—MANVILLE, N.J. Somerset Signal Senders Interclub Meet. Site: SSS Field. H. Wachter CD, 139 New Amwell Rd., Somerville, N.J. 08876. Sponsor: Somerset Signal Senders.

JUNE 17—FELTON, DELA. (A) ECSS Thermal Soaring RC Contest. Site: Felton. G. Durney CD, 107 Silver Lake Dr., Dover, Dela. 19901. Sponsor: Dover Mosquitoes.

JUNE 17—HENRICO COUNTY, VA. Curles Neck RC Glider Fun Fly. Site: Curles Neck Farm. J. Novak, Jr. CD, P.O. Box 539, Chester, Va. 23831. Sponsor: Curles Neck FF & Soaring Soc.

JUNE 17—LAKEHURST, N.J. N.J. RC Club 3rd Annual Old Timers Meet. Site: Lakehurst N.A.S. R. Glasgow CD, 48 E. Maltbie Ave., Suffern, N.Y. 10901. Sponsor: North Jersey RC Club.

JUNE 17—ST. CHARLES, ILL. (A) Flying Fools RC Pylon Races. Site: St. Charles RC Field. F. Morosky CD, 6416 W. 33rd St., Berwyn, Ill. 60402. Sponsor: Chicago Pylon Club & Flying Fools.

JUNE 17—DANSVILLE, MICH. (A) C.A.R.D.S. First Annual RC Stand-Off Scale Jamboree. Site: Dansville. C. Spencer CD, 236 Theo St., Lansing, Mich. 48917. Sponsor: Capital Area Drone Drone Squadron.

JUNE 17—CINCINNATI, OHIO (AA) Queen City CL "Summer's Here Contest." Site: Lunken Airport. W. Messerly CD, 1122 Eight Mile Rd., Cincinnati, Ohio 45230. Sponsor: Queen City U-Control.

JUNE 17—W. SUFFIELD, CONN. (A) Nor'East RC Air Races '73. Site: W. Suffield. B. Williams CD, 347 Southwick Rd., Westfield, Ma. 01085. Sponsor: Northern Connecticut RC Club.

JUNE 17—JAMESTOWN, N.Y. (AA) United Pylon Racing Circuit RC Meet. Site: Jamestown. W. Johnson CD, 153 Hallock St., Jamestown, N.Y. 14701.

JUNE 17—SALEM, N.H. (AA) 4th Annual Salem CL Model Airplane Fair. Site: Salem High School. R. Sherman CD, 408 River Rd., Tewksbury. Mass. 01876. Sponsor: Merrimac Valley Air-Istocrats.

JUNE 23-24—COLUMBIA, MO. (AA) Mid-Missouri First Open RC Meet. Site: Old Municipal Airport. B. Webb CD, P.O. Box 475, Columbia, Mo. 65201.

JUNE 23-24—HILLSBORO, ORE. (AA) Nor'Westers 5th Annual FF Contest. Site: Hillsboro. J. Lenderman CD, Rt. 2, Box 460, St. Helens, Ore. 97051.

JUNE 23-24—DAYTON, OHIO (AA) Wright Brothers Memorial Annual RC Meet. Site: Wright Patterson A.F.B. D. Lowe CD, 3491 Clar-Von Dr., Dayton, Ohio 45430. Sponsor: Western Ohio RK Society.

JUNE 23-24—ANDREWS A.F.B., MD. (AA) National Capitol RC Pattern Tournament. Site: Andrews A.F.B. T. Carey CD, 17900 Cliffbourne La., Derwood, Md. 20855. Sponsor: DC/RC Club.

JUNE 23-24—NEWARK, CALIF. (A) California Standoff Scale Championships. Site: Willow Ave. G. Horstman CD, P.O. Box 356, Milpitas, Calif. 95035. Sponsor: Southern Alameda County Radio Controllers.

JUNE 23-24—MARIETTA, GA. (AA) 5th Annual CCRC Pattern Meet. Site: CCRC Club Field. J. Harper CD, 900 Piedmont Cir., Marietta, Ga. 30062.

JUNE 23-24—VALLEY FORGE, PENNA. (A) Second Annual Valley Forge RC Scale Classic. Site: Valley Forge. N. Evans CD, 970 Steven Ln., Wayne, Pa. 19087. Sponsor: Valley Forge Signal Seekers.

JUNE 23-24—OSSEO, MINN. (AAA) 10,000 Lakes CL Championships. Site: N. Hennepin Junior College. R. Kampmann CD, 2443 Pillsbury Ave., S. Minneapolis, Minn. 55404. Sponsor: Minneapolis Piston Poppers, Inc.

JUNE 23-24—WICHITA, KANS. (AAA) 13th Midwestern FF, CL & RC Championships. Site: 13th & Webb Rds. M. Tallman CD, 3014 Exchange, Wichita, Kans. 67217. Sponsor: Wichihawks.

JUNE 23-24—MONROE, N.C. (AA) MR/CC RC Air Races. Site: Monroe. C. Whilden CD, 4735 Emery Ln., Charlotte, N.C. Sponsor: Monroe RC Club.

JUNE 23-24—OKLAHOMA CITY, OKLA. (AA) TORKS Annual RC Meet. Site: TORKS Field. R. Freeland, Jr. CD, 7308 N. Western, Oklahoma City, Okla. 73116.

JUNE 23-24—CORPUS CHRISTI, TEX. (AA) Corpus Christi RC Club Meet. Site: Waldron Field. G. Stephens CD, 705 John Lee, Corpus Christi, Tex. 28412. Sponsor: Corpus Christi RC Club.

JUNE 24—SPRING VALLEY, ILL. (A) IVRC Annual RC Contest. Site: Spring Valley Airport. H. Sutherland CD, 303 Thompson, Princeton, Ill. 61356. Sponsor: Illinois Valley Radio Control Club.

JUNE 24—FRESNO, CALIF. (A) F.G.M.C. Monthly FF (Cat. I) Meet. Site: Ave. 12, Road 37 1/2. F. Ginder, Jr. CD, 5740 E. Ashlan Ave., Fresno, Calif. 93727. Sponsor: Fresno Gas Model Club.

JUNE 24—WASHINGTON, D.C. (AA) Summer CL Meet. Site: Anacostia Naval Air Station. M. Strieter CD, 459 University Blvd. E., Silver Spring, Md. 20784. Sponsor: Sky Lancers of Washington, D.C.

JUNE 24—HADLEY, MASS. (A) Hampshire County Wind Free Glider RC Meet. Site: Hadley. R. Barkowski CD, 32 Lyman St., Easthampton, Mass. 01027. Sponsor: Hampshire County Radio Controllers.

JUNE 24—CHAGRIN FALLS, OHIO (B) 2nd Annual Great Lakes Rubber Scale Indoor Meet. Site: Savage Road. V. Didelot CD, 4410 Lorna Ln., Erie, Penna. 16506. Sponsor: Erie Model Aircraft Assn.

JUNE 24—CLEVELAND, OHIO (AA) Cleveland CL Rally. Site: Cleveland CL Model Field. J. Grega CD, 355 Grand Blvd. Bedford, Ohio 44146. Sponsor: Lakewood Flightmasters & Lake Erie Gas Model Club.

JUNE 24—BALLSTONSPA, N.Y. (A) Empire State RC Racing Meet. Site: Saratoga County Airport. A. Sattler CD, 29 Waldorf Pl., Schenectady, N.Y. 12307. Sponsor: Thundervolts RC Club, Inc.

JUNE 24—OLEAN, N.Y. (AA) United Pylon Racing Circuit RC Meet. Site: Olean. B. Brown CD, 1255 High St., Bradford, Pa. 16701.

JUNE 24—RICE LAKE, WISC. (A) Hawks Friendly Summer FF (Cat. II) Contest. Site: Barron County Campus. F. Kelley CD, 20 Phipps Ave., Rice Lake, Wisc. 54668. Sponsor: Hardscrabble Hawks Model Airplane Club.

JUNE 24—DALLAS, TEX. (A) 1/4 Midget RC Pylon Race. Site: Northlake Field. D. Hyde CD, 207 Leda Dr., Dallas, Tex. 75218. Sponsor: Dallas RC Club.

JUNE 29-30—ANAHEIM, CALIF. (B) Orbit Invitational RC Helicopter Meet. Site: Anaheim Convention Center. J. Elliot CD, 19412. Olana Ln., Huntington Bch., Calif. 92646.

JUNE 30-JULY 1—SYRACUSE, N.Y. (AA) Syracuse ARCS 2nd Annual RC Pattern Meet. Site: A.R.C.S. Field. W. Thorne CD, 208 Windemere Rd., Syracuse, N.Y. 13219. Sponsor: Aero Radio Club of Syracuse.

JUNE 30-JULY 1—ABILENE, TEX. (AAA) 5th Annual Key City Prop Twisters CL Meet. Site: Sea Bee Park. R. Patty CD, 1718 Highland, Abilene, Tex. 79605. Sponsor: Key City Prop Twisters.

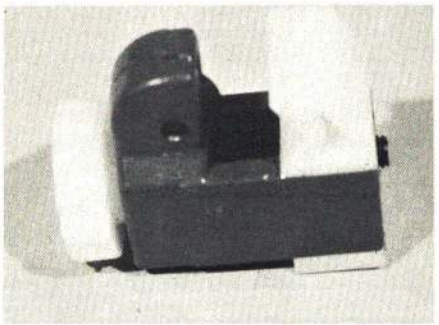
JUNE 30-JULY 1—MANKATO, MINN. (AAA) Annual Midwest CL Championships. Site: Madison East Shopping Center. D. Nirk CD, 821 N. 2nd St., Mankato, Minn. 56001. Sponsor: Mankato Modeleers.

JUNE 30-JULY 1—MOWEAQUA, ILL. (A) Blunderbirds RC Thermal Soaring Contest. Site: Kroenlein's Airport. D. Holtfreter CD, P.O. Box 366, Blue Mound, Ill. 62513. Sponsor: Decatur Blunderbirds.

TOLEDO PRODUCTS

(Continued from page 101)

wood, this field box is balanced due to the fuel compartment centered under the handle. Field box is completely built up with a brown stain finish and brass hardware. Box also has transmitter, starter, battery compartments. $34.95. Also available in kit form $29.95. The 60-minute timer will prevent deadstick landings from occuring due to too long a flight, $5.95. Richard's Enterprises, Frankenfield Rd., Ottsville, Penn. 18942.

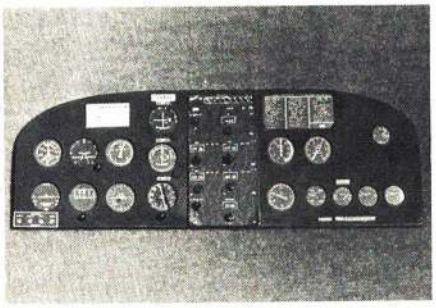


K&S ENGINEERING/TUBING CUTTER—Constructed of nylon and metal, this tubing cutter will cut 1/16-in. to 1/2-in. glass, aluminum, and copper tubes. $1.95. K&S Engineering, 6917 West 59th St., Chicago, Ill. 60638.

FAGEL BROTHERS/PATCHES—An ideal way for clubs or organizations to have a design transformed into attractive patches for use on jackets, shirts, etc. T-shirts and jackets are also available and prices depend basically on quantity. Design service is available. Fagel Brothers, 3930 Pinegrove, Chicago, Ill. 60613.

ROCKET CITY/DUMMY SERVO—First of a series of Dummy Servos, this new accessory is

the size of KPS-10 servo which can be used to set up control surfaces if radio is being occupied in another airplane. For those who tend to drop servos and get epoxy on them, this can be quite a savings as there is no chance of damaging expensive servos. Drill bushings for centering screw holes are provided, $1.59 each. Rocket City R/C Specialties, 103 Wholesale Ave. NE, Huntsville, Ala. 35811.

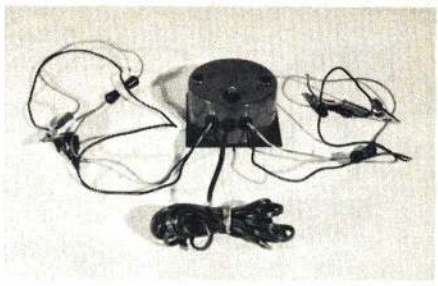


JP PRODUCTS/INSTRUMENT PACKAGES—A mock-up of the Cessna Skylane Instrument Panel is in photographically reproduced 2 in. to 1 ft. scale instruments from JP Products. JP has standard and green illuminated style packages of private military and helicopter instruments. Toggle switches and knobs are to be added soon. Prices range from $1 to $1.50 per package with approximately 20 instruments per package. JP Products, P.O. Box 58, Harrisburg, Ill. 62946.

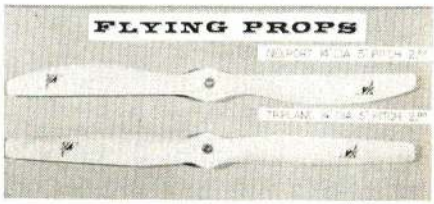
JMD/ENGINE FUELS—All of JMD's fuels contain a synthetic lubricant in place of the castor oil used in most fuels today. The

synthetic lubricant provides for cleaner operation in both engine and fuel system. Less smoke and exhaust, no varnish on engine heads and increased power. A number of different sizes of cans are available in nitro ranges from five to 30%. JMD Fuel Labs, P.O. Box 235, North Olmsted, Ohio 44070.

MODEL AIR PRODUCTS/PRIMER RESIN—This product combines a polyester resin with a primer coat. Only two coats are needed and the result is a base coat for lacquers, enamels, epoxy, etc. Weight, as well as time, is saved and a coat dries completely in one hour. $5 per quart. Model Air Products, Box 8085, Canton, Ohio 44711.



JCM/DUAL CHARGER—This new concept in chargers is capable of charging either your glowplug or electric starter battery or both at the same time as there is a 12 and 2 volt output. Charger has a full-wave rectifier. $22.50. JCM Specialties, Box 194, Addison, Ill. 60101.

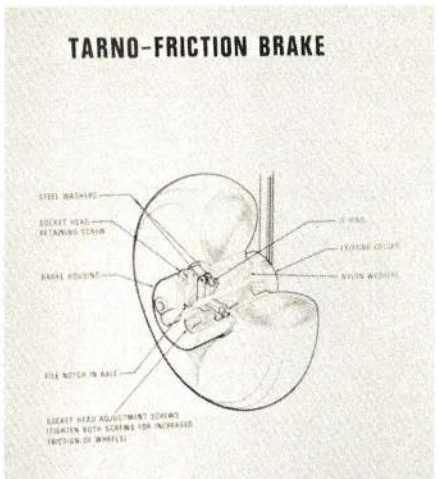


VK MODELS/SCALE PROPELLERS—Two styles of propellers—scale props available for

INDEX TO ADVERTISERS

JUNE 1973

the *Camel Fokker Triplane*, and *Nieuport* are handcrafted from laminated walnut. 1/6 full scale. $5.95. Flying props—two sizes available for Nieuport and Fokker Triplane, 14-in. diameter, five-in. pitch, $2 each. Props are semi-scale designed especially for those two airplanes and 60 engines. VK Model Aircraft Co., 12072 Main Rd., Route 5, Akron, N.Y. 14001.



STRATO MODEL PRODUCTS/TARNO DRAG BRAKE—This new style brake replaces the collar on the outside of the wheel and produces a constant amount of friction on the wheel hub to restrict the wheel's movement. The brake is adjustable from a free wheel to a locked up position and uses a series of washers, O rings and set screws to attain this adjustment. All metal construction. $3.95. Strato Model Products, Route 6, Blakely, Penn. 18447.

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AEROMODELING Basic methods of constructing gliders, rubber-powered, free-flight, control-line and radio-control models. Inculudes covering and doping, selection and operation of engines. Illustrated. Only $4.50. COLONIAL SHOPPING SERVICE, P.O. Box 8114, Canton, Ohio 44711.

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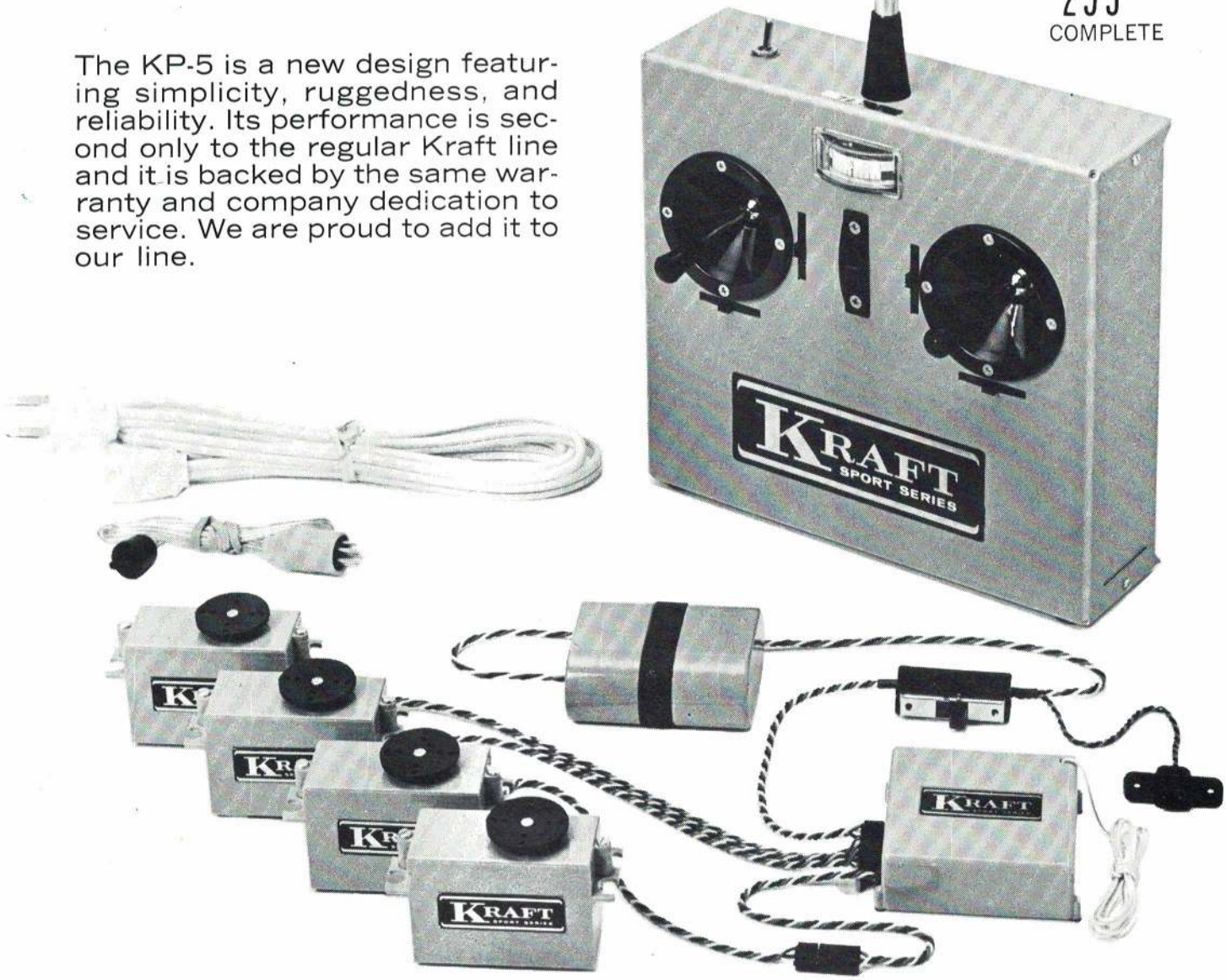

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